TOSHIBA

FILE NO. SVM-12072

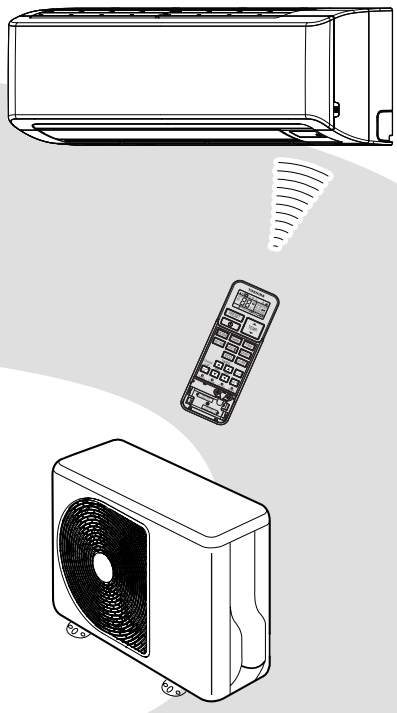
SERVICE MANUAL

AIR-CONDITIONER
SPLIT TYPE

Indoor Unit

<High Wall, Heat Pump Type>

RAS-M07N3KV2-E



HFC
R410A

January, 2013

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1. SAFETY PRECAUTIONS

The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.
Be sure to read this installation manual carefully before installing.
Recommend to the owner to perform maintenance periodically when using over long periods of time.
Be sure to follow the precautions provided here to avoid safety risks. The symbols and their meanings are shown below.

DANGER : It indicates that incorrect use of this unit can result in a high possibility of severe injury (*1) or death.
WARNING : It indicates that incorrect use of this unit may cause severe injury of death.
CAUTION : It indicates that incorrect use of this unit may cause personal injury (*2) or property damage (*3).

*1 : A severe injury refers to blindness, injury, burns (hot or cold), electrical shock, bone fracture, or poisoning that leaves aftereffects and requires hospitalization or extended out-patient treatment.
*2 : Personal injury means a slight accident, burn, or electrical shock which does not require admission or repeated hospital treatment.
*3 : Preperty damage means greater damage which affects assets or resources.

For general public use

Power supply cord of parts of appliance for outdoor use shall be at least polychloroprene sheathed flexible cord (design H07RN-F) or cord designation 60245 IEC66 (1.5 mm2 or more). (Shall be installed in accordance with national wiring regulations.)

CAUTION

New refrigerant air conditioner installation

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A), WHICH DOES NOT DESTROY OZONE LAYER.**

R410A refrigerant is apt to be affected by impurities such as water, oxidizing membranes, and oils because the pressure of R410A refrigerant is approx. 1.6 times of refrigerant R22. As well as the adoption of this new refrigerant, refrigerating machine oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating machine oil does not enter the refrigeration cycle of a new-refrigerant air conditioner. To avoid mixing refrigerant and refrigerating machine oil, the sizes of charging port connecting port connecting sections on the main unit are different from those for the conventional refrigerant, and different size tools are also required. For connecting pipes, use new and clean piping materials with highpressure withstand capabilities, designed for R410A only, and ensure that water or dust does not enter. Moreover, do not use any existing piping as its pressure withstand may be insufficient and may contain impurities.

DANGER

- FOR USE BY QUALIFIED PERSONS ONLY.
- MEANS FOR DISCONNECTION FROM THE SUPPLY HAVING A CONTACT SEPERATION OF AT LEAST 3 mm IN ALL POLES MUST BE INCORPORATED IN THE FIXED WIRING.
- TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING ANY ELECTRICAL WORK, MAKE SURE ALL POWER SWITCHES ARE OFF FAILURE TO DO SO MAY CAUSE ELECTRIC SHOCK.
- CONNECT THE CONNECTING CABLE CORRECTLY. IF THE CONNECTING CABLE IS CONNECTED WRONGLY, ELECTRIC PARTS MAY BE DAMAGED.
- CHECK THE EARTH WIRE THAT IT IS NOT BROKEN OR DISCONNECTED BEFORE INSTALLATION.
- DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION.
- TO PREVENT OVERHEATING THE INDOOR UNIT AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEATERS, FURNACE, STOVES, ETC.
- WHEN MOVING THE AIR CONDITIONER FOR INSTALLING IT IN ANOTHER PLACE AGAIN, BE VERY CAREFUL NOT TO GET THE SPECIFIED REFRIGERANT (R410A) WITH ANY OTHER GASEOUS BODY INTO THE REFRIGERATION CYCLE. IF AIR OR ANY OTHER GAS IS MIXED IN THE REFRIGERANT, THE GAS PRESSURE IN THE REFRIGERATION CYCLE BECOMES ABNORMALLY HIGH AND IT RESULTINGLY CAUSES BURST OF THE PIPE AND INJURIES ON PERSONS.
- IN THE EVENT THAT THE REFRIGERANT GAS LEAKS OUT OF THE PIPE DURING THE INSTALLATION WORK, IMMEDIATELY LET FRESH AIR INTO THE ROOM. IF THE REFRIGERANT GAS IS HEATED BY FIRE OR SOMETHING ELSE, IT CAUSES GENERATION OF POISONOUS GAS.
- WHEN INSTALLING OR RE-INSTALLING THE AIR CONDITIONER, DO NOT INJECT AIR OR OTHER SUBSTANCES BESIDES THE DESIGNATED REFRIGERANT "R410A" INTO THE REFRIGERATION CYCLE. IF AIR OR OTHER SUBSTANCES ARE MIXED, AN ABNORMAL PRESSURE CAN OCCUR IN THE REFRIGERATING CYCLEL, AND THIS CAN CAUSE AN INJURY DUE TO A PIPE RUPTURE.

WARNING

- Installation work must be requested from the supplying retail dealership or professional vendors. Self-installation may cause water leakage, electrical shock, or fire as a result of improper installation.
- Specified tools and pipe parts for model R410A are required, and installation work must be done in accordance with the manual. HFC type refrigerant R410A has 1.6 times more pressure than that of conventional refrigerant (R22). Use the specified pipe parts, and ensure correct installation, otherwise damage and/or injury may be caused. At the same time, water leakage, electrical shock, and fire may occur.
- Be sure to install the unit in a place which can sufficiently bear its weight. If the load bearing of the unit is not enough, or installation of the unit is improper, the unit may fall and result in injury.
- Electrical work must be performed by a qualified elecrical engineer in accordance with the code governing such installation work, inernal wiring regulations, and the manual. A dedicated circuit and the rated voltage must be used. Insufficient power supply or improper installation may cause electrical shock or fire.
- Use a cabtyre cable to connect wires in the indoor/outdoor units. Midway connection, stranded wire, and single-wire connections are not allowed. Improper connection or fixing may cause a fire.
- Wiring between the indoor unit and outdoor units must be well shaped so that the cover can be firmly placed. Improper cover installation may cause increased heat, fire, or electrical shock at the terminal area.
- Be sure to use only approved accessories or the specified parts. Failure to do so may cause the unit to fall, water leakage, fire or electrical shock.
- After the installation work, ensure that there is no leakage of refrigerant gas. If the refrigerant gas leaks out of the pipe into the room and is heated by fire or something else from a fan heater, stove or gas range, it causes generation of poisonous gas.
- Make sure the equipment is properly earthed. Do not connect the earth wire to a gas pipe, water pipe, lightning conductor, or telephone earth wire. Improper earth work may be the cause of electrical shock.
- Do not install the unit where flammable gas may leak. It there is any gas leakage or accumulation around the unit, it can cause a fire.
- Do not select a location for installation where there may be excessive water or humidity, such as a bathroom. Deterioration of insulation may cause elestrical shock or fire.
- Installation work must be performed following the instructions in this installation manual. Improper installation may cause water leakage, electrical shock or fire. Check the following items before operating the unit.
  - Be sure that the pipe connection is well placed and there are no leaks.
  - Check that the service valve is open. If the service valve is closed, it may cause overpressure and result in compressor damage. At the same time, if there is a leak in the connection part, it may cause air suction and overpressure, resulting burst or injury.
- In pump down operations, ensure to perform the following procedures.
  - Do not inject air into the refrigeration cycle.
  - Be sure to close both service valves and stop the compressor before removing the refrigerant pipe. It removing the refrigerant pipe while the compressor is operating with the service valves opened, it may cause to air absorbed and abnormal high pressure inside the refrigeration cycle and resulting burst or injury.
- Do not modify the power cable, connect the cable midway, or use a multiple outlet extension cable. Doing so may cause contact failure, insulation failure, or excess current, resulting in fire or electrical shock.
- Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
- Be sure to comply with local regulations/codes when running the wire from the outdoor unit to the indoor unit, (Size of wire and wiring method etc.).
- Places where iron or other metal dust is present. If iron or other metal dust adheres to or collects on the interior of the air conditioner, it may spontaneously combust and start a fire.
- If you detect any damage, do not install the unit. Contact your supplying dealer immediately.
- Never modify this unit by removing any of the safety guards.
- Do not install in a place which cannot bear the weight of the unit. Personal injury and property damage can result if the unit falls.

CAUTION

- Please read this installation manual carefbefore installing the unit. It contains further important instructions for proper installation.
- Exposure of unit to water or other moisture before installation could result in electric shock. Do not store it in a wet basement or expose to rain or water.
- After unpacking the unit, examine it carefully for possible damage.
- Do not install in a place that can increase the vibration of the unit. Do not install in a place that can amplify the noise level of the unit or where noise and discharged air might disturb neighbors.
- This appliance must be connected to the main power supply by means of a circuit breaker depending on the place where the unit is installed. Failure to do so may cause electrical shock.
- Follow the instructions in this installation manual to arrange the drain pipe for proper drainage from the unit. Ensure that drained water is discharged. Improper drainage can result in water leakage, causing water damage to furniture.
- Tighten the flare nut with a torque wrench using the prescribed method. Do not apply excess torque. Otherwise, the nut may crack after a long period of usage and it may cause the leakage of refrigerant.
- Wear gloves (heavy gloves such as cotton gloves) for installation work. Failure to do so may cause personal injury when handling parts with sharp edges.
- Do not touch the air intake section or the aluminum fins of the outdoor unit. It may cause injury.
- Do not install the outdoor unit in a place which can be a nest for small animals. Small animals could enter and contact internal electrical parts, causing a failure or fire.
- Request the user to keep the place around the unit tidy and clean.
- Make sure to conduct a trial operation after the installation work, and explain how to use and maintain the unit to the customer in accordance with the manual. Ask the customer to keep the operation manual along with the installation manual.

2. SPECIFICATIONS

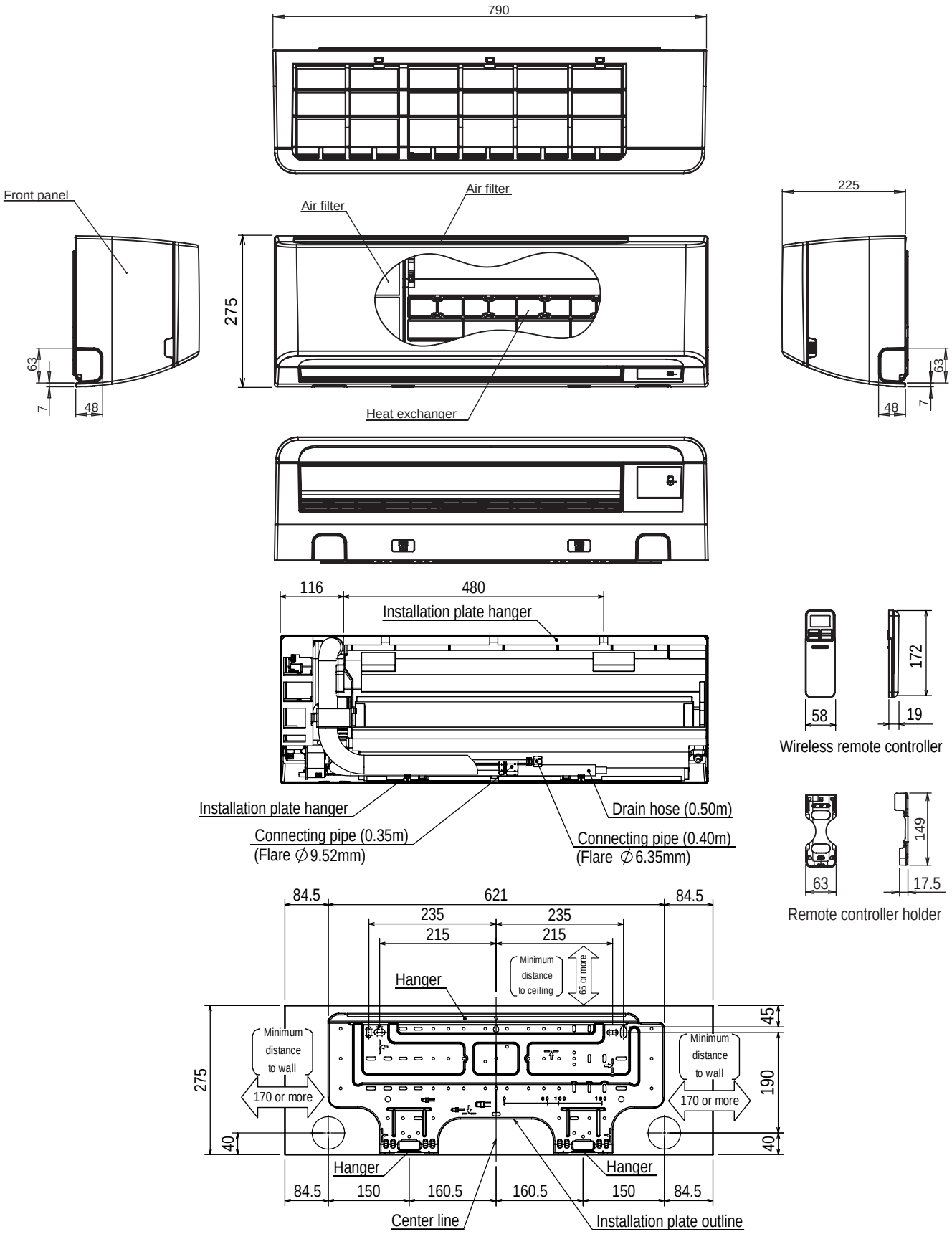
Unit model	Indoor		**RAS-M07N3KV2-E**	
	Outdoor		∗1	
Cooling capacity		(kW)	∗1	
Cooling capacity range		(kW)	∗1	
Heating capacity		(kW)	∗1	
Heating capacity range		(kW)	∗1	
Power supply			220~240V-1Ph-50Hz / 220V-1Ph-60Hz	
Electric characteristic	Indoor	Unit model	**RAS-M07N3KV2-E**	
		Running current (A)	0.21-0.19	
		Power consumption (W)	35	
		Power factor (%)	75	
	Outdoor	Operation mode	**Cooling**	**Heating**
		Running current (A)	∗1	∗1
		Power consumption (W)	∗1	∗1
		Power factor (%)	∗1	∗1
		Starting current (A)	∗1	∗1
COP(Cooling/Heating)			∗1	∗1
Operating noise dB(A)	Indoor (Cooling/ Heating)	Unit model	**RAS-M07N3KV2-E**	
		High	38/38	
		Medium	33/33	
		Low	26/28	
	Outdoor	Cooling	∗1	
		Heating	∗1	
Indoor unit	Unit model		**RAS-M07N3KV2-E**	
	Dimension (mm)	Height	275	
		Width	790	
		Depth	225	
	Net weight	(kg)	10	
	Fan motor output	(W)	20	
	Air flow rate (m3/h) (Cooling/Heating)		8.6/9.5	
Outdoor unit	Dimension (mm)	Height	∗1	
		Width	∗1	
		Depth	∗1	
	Net weight	(kg)	∗1	
	Compressor	Motor output (W)	∗1	
		Type	∗1	
		Model	∗1	
	Fan motor output	(W)	∗1	
	Air flow rate (m3/h) (Cooling/Heating)		∗1	
	Type		Flare connection	
Piping connection	Indoor unit	Unit model	**RAS-M07N3KV2-E**	
			∅6.35	
			∅9.52	
	Outdoor unit	Liquid side	∗1	
		Gas side	∗1	
	Maximum length (per unit)	(m)	∗1	
	Minimum length (per unit)	(m)	∗1	
	Maximum length (total)	(m)	∗1	
	Maximum chargeless length	(m)	∗1	
	Additional refriderant		∗1	
	Maximum height difference	(m)	∗1	
	Name of refrigerant		R410A	
	Weight	(kg)	∗1	
Wiring connection		Power supply	3 Wires : includes earth	
		Interconnection	4 Wires : includes earth	
Usable temperature range		Indoor (Cooling/Heating) (°C)	21 - 32/ -	
		Outdoor (Cooling/Heating) (°C)	∗1	
Accessory	Indoor unit	Installation plate	1	
		Wireless remote control	1	
		Remote control holder	1	
		Pan head wood screw	2(∅3.1 x 16L)	
		Super Oxi Deo filter	1	
		Super Sterilizer filter	1	
		Battery	2	
		Mounting screw	6(∅4 x 25L)	
		Owner's manual	1	
		Installation manual	1	

∗1 : Refer to the service manual of the multi outdoor unit to be combined.

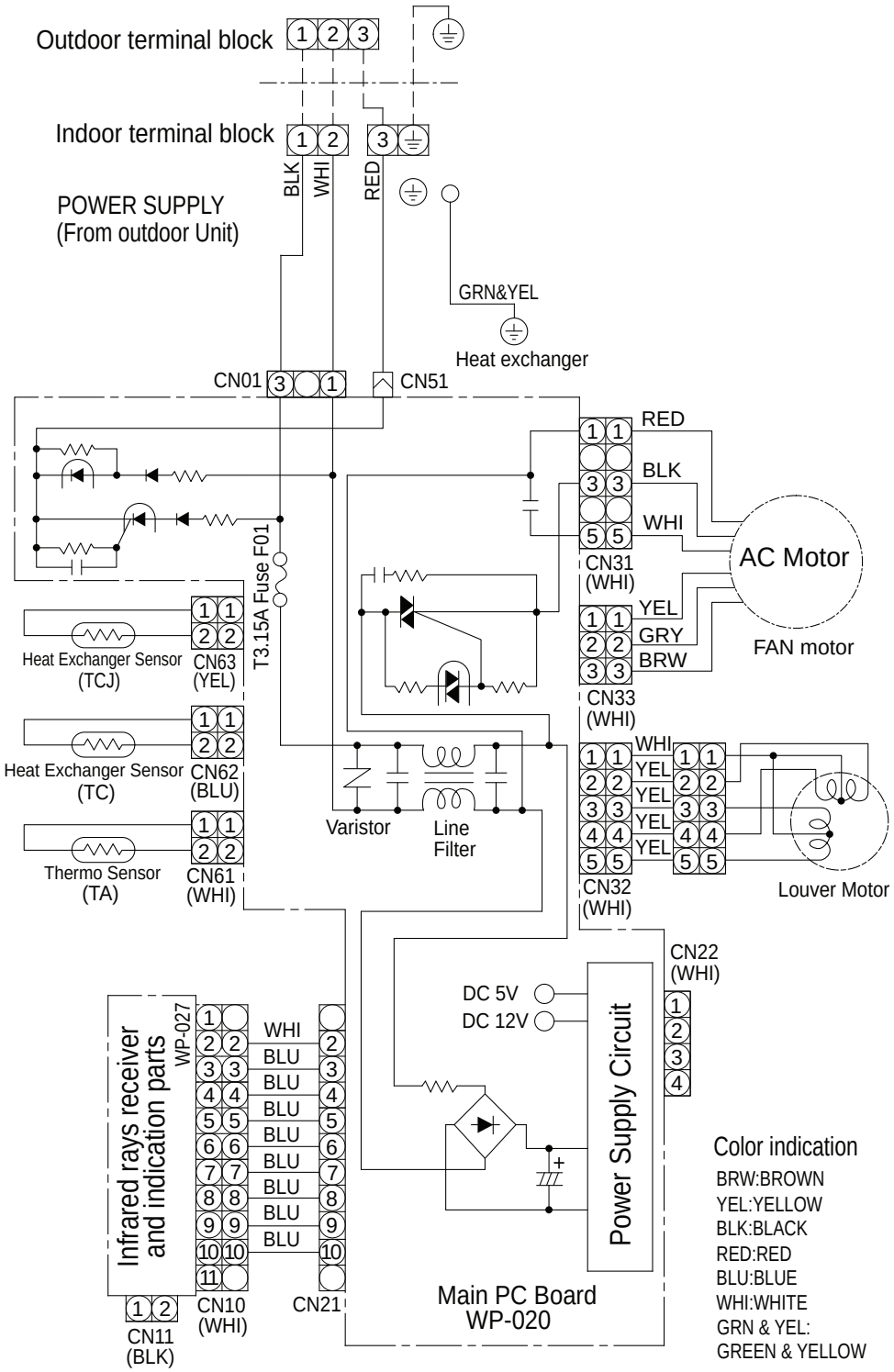
Note
The specifications may be subject to change without notice for purpose of improvement.

3. CONSTRUCTION VIEWS

Indoor Unit



4. WIRING DIAGRAM

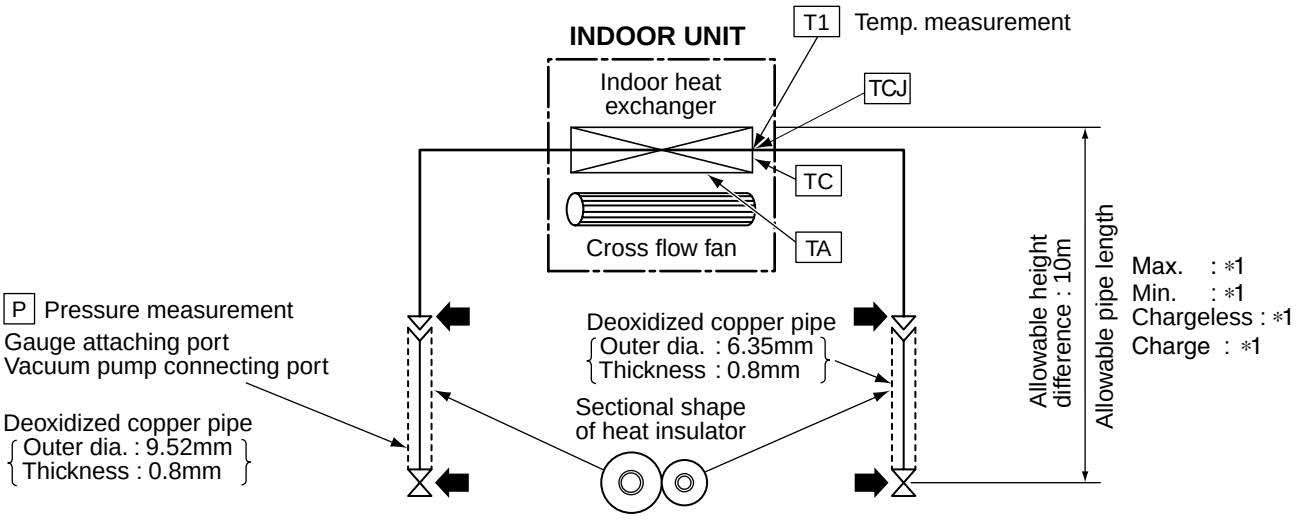


5. SPECIFICATIONS OF ELECTRICAL PARTS

Indoor Unit

No.	Parts name	Type	Specifications
1	Fan motor (for indoor)	AFN-220-20-4D	AC 240V, 20W
2	Room temp. sensor (TA-sensor)	(-)	10kΩ at 25℃
3	Heat exchanger temp. sensor (TC-sensor)	(-)	10kΩ at 25°C
4	Louver motor	MSBPC20F04	Output (Rated) 1W, 16 poles, DC12V

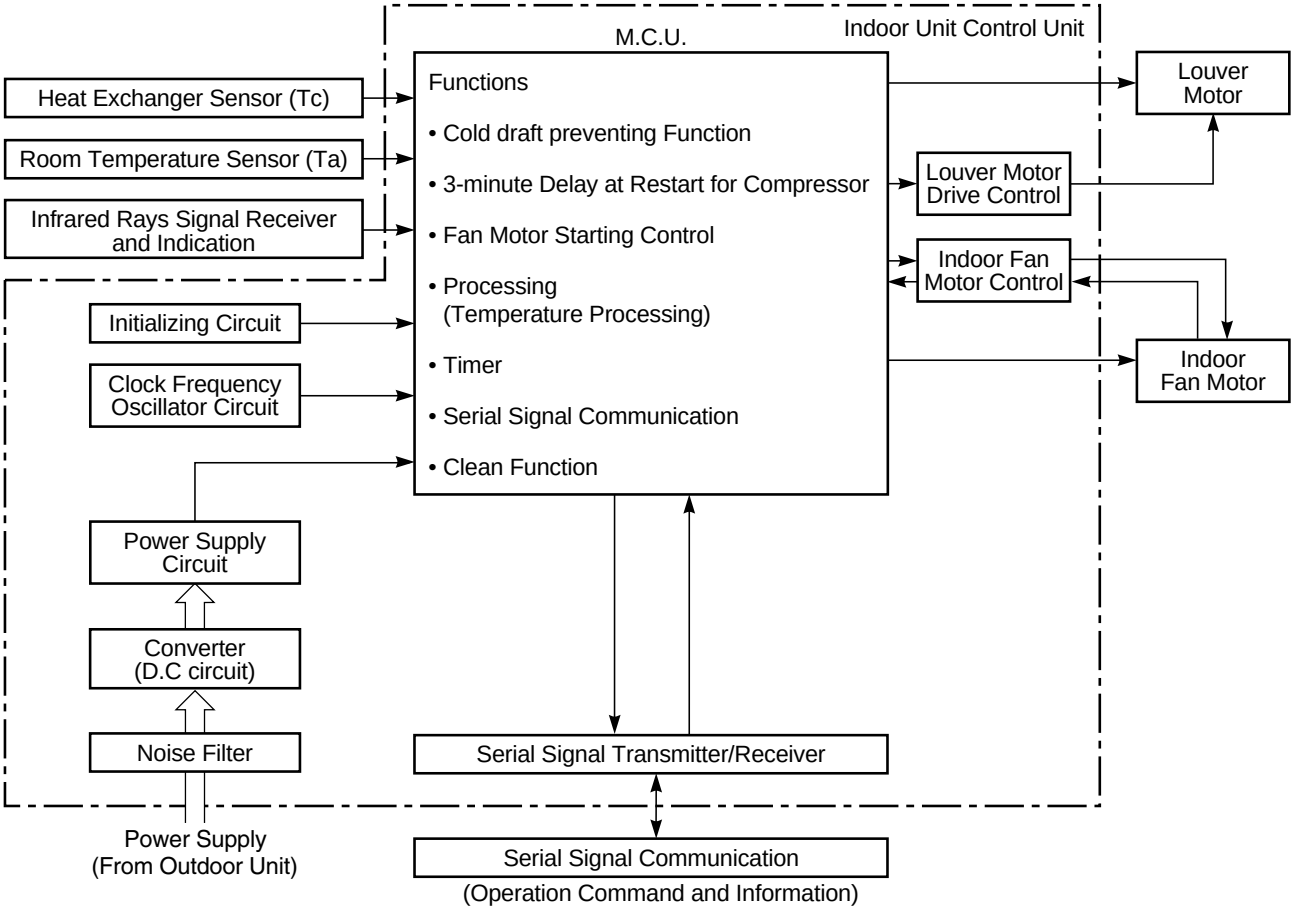
6. REFRIGERANT CYCLE DIAGRAM



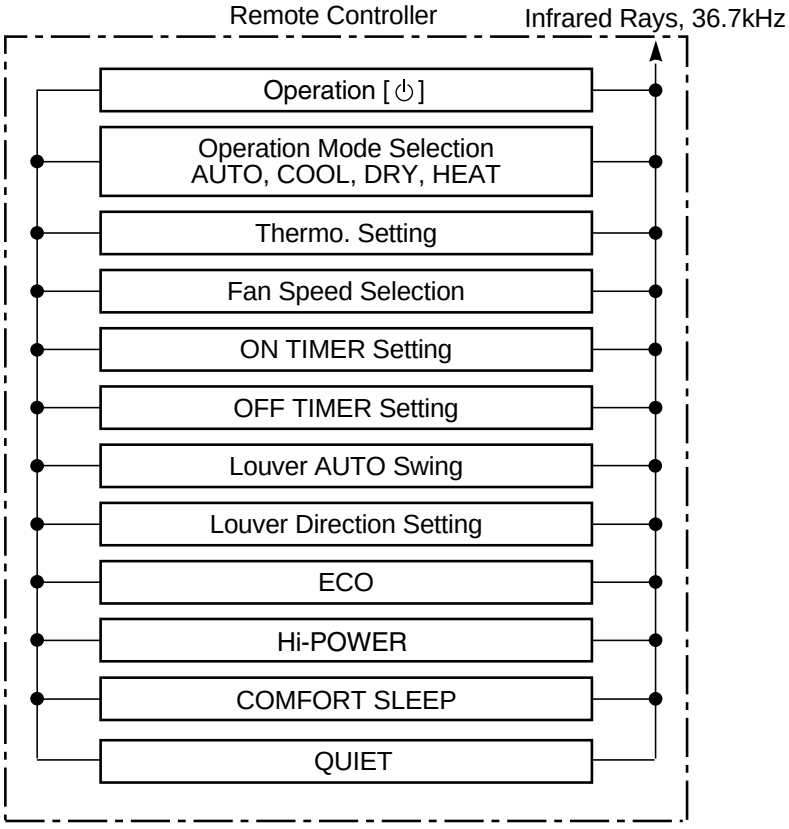
*1 : Refer to the service manual of multi outdoor unit to be combined.

7. CONTROL BLOCK DIAGRAM

Indoor Unit



REMOTE CONTROLLER



8. OPERATION DESCRIPTION

8-1. Outline of Air Conditioner Control

This air conditioner is a capacity-variable type air conditioner, which uses AC or DC motor for the indoor for motor and the outdoor fan motor. And the capacity-proportional control compressor mounted. The DC motor drive circuit is mounted to the indoor unit.
The compressor and the inverter to control fan motor are mounted to the outdoor unit.

The entire air conditioner is mainly controlled by the indoor unit controller.

The indoor unit controller drives the indoor fan motor based upon command sent from the remote controller, and transfers the operation command to the outdoor unit controller.

The outdoor unit controller receives operation command from the indoor unit side, and controls the outdoor fan and the pulse motor valve. (P.M.V)
Besides, detecting revolution position of the compressor motor, the outdoor unit controller controls speed of the compressor motor by controlling output voltage of the inverter and switching timing of the supply power (current transfer timing) so that motors drive according to the operation command.
And then, the outdoor unit controller transfers reversely the operating status information of the outdoor unit to control the indoor unit controller.

As the compressor adopts four-pole brushless DC motor, the frequency of the supply power from inverter to compressor is two-times cycles of the actual number of revolution.

1. Role of indoor unit controller

The indoor unit controller judges the operation commands from the remote controller and assumes the following functions.

- Judgment of suction air temperature of the indoor heat exchanger by using the indoor temp. sensor. (TA sensor)
- Judgment of the indoor heat exchanger temperature by using heat exchanger sensor (TC sensor) (Prevent-freezing control, etc.)
- Louver motor control
- Indoor fan motor operation control
- LED (Light Emitting Diode) display control
- Transferring of operation command signal (Serial signal) to the outdoor unit
- Reception of information of operation status (Serial signal including outside temp. data) to the outdoor unit and judgment/display of error

2. Role of outdoor unit controller

Receiving the operation command signal (Serial signal) from the indoor unit controller, the outdoor unit performs its role.

- Compressor operation control
- Operation control of outdoor fan motor
- P.M.V. control
- 4-way valve control (Heat Pump model only)

} Operations followed to judgment of serial signal from indoor side.

- Detection of inverter input current and current release operation
- Over-current detection and prevention operation to IGBT module (Compressor stop function)
- Compressor and outdoor fan stop function when serial signal is off (when the serial signal does not reach the board assembly of outdoor control by trouble of the signal system)
- Transferring of operation information (Serial signal) from outdoor unit controller to indoor unit controller
- Detection of outdoor temperature and operation revolution control
- Defrost control in heating operation (Temp. measurement by outdoor heat exchanger and control for 4-way valve and outdoor fan)

3. Contents of operation command signal (Serial signal) from indoor unit controller to outdoor unit controller

The following three types of signals are sent from the indoor unit controller.

- Operation mode set on the remote controller
- Compressor revolution command signal defined by indoor temperature and set temperature (Correction along with variation of room temperature and correction of indoor heat exchanger temperature are added.)
- Temperature of indoor heat exchanger
- For these signals ([Operation mode] and [Compressor revolution] indoor heat exchanger temperature), the outdoor unit controller monitors the input current to the inverter, and performs the followed operation within the range that current does not exceed the allowable value.

4. Contents of operation command signal (Serial signal) from outdoor unit controller to indoor unit controller

The following signals are sent from the outdoor unit controller.

- The current operation mode
- The current compressor revolution
- Outdoor temperature
- Existence of protective circuit operation

  For transferring of these signals, the indoor unit controller monitors the contents of signals, and judges existence of trouble occurrence.

  Contents of judgment are described below.
  - Whether distinction of the current operation status meets to the operation command signal
  - Whether protective circuit operates

    When no signal is received from the outdoor unit controller, it is assumed as a trouble.

8-2. Operation Description

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8-4. Remote Controller and Its Fuctions

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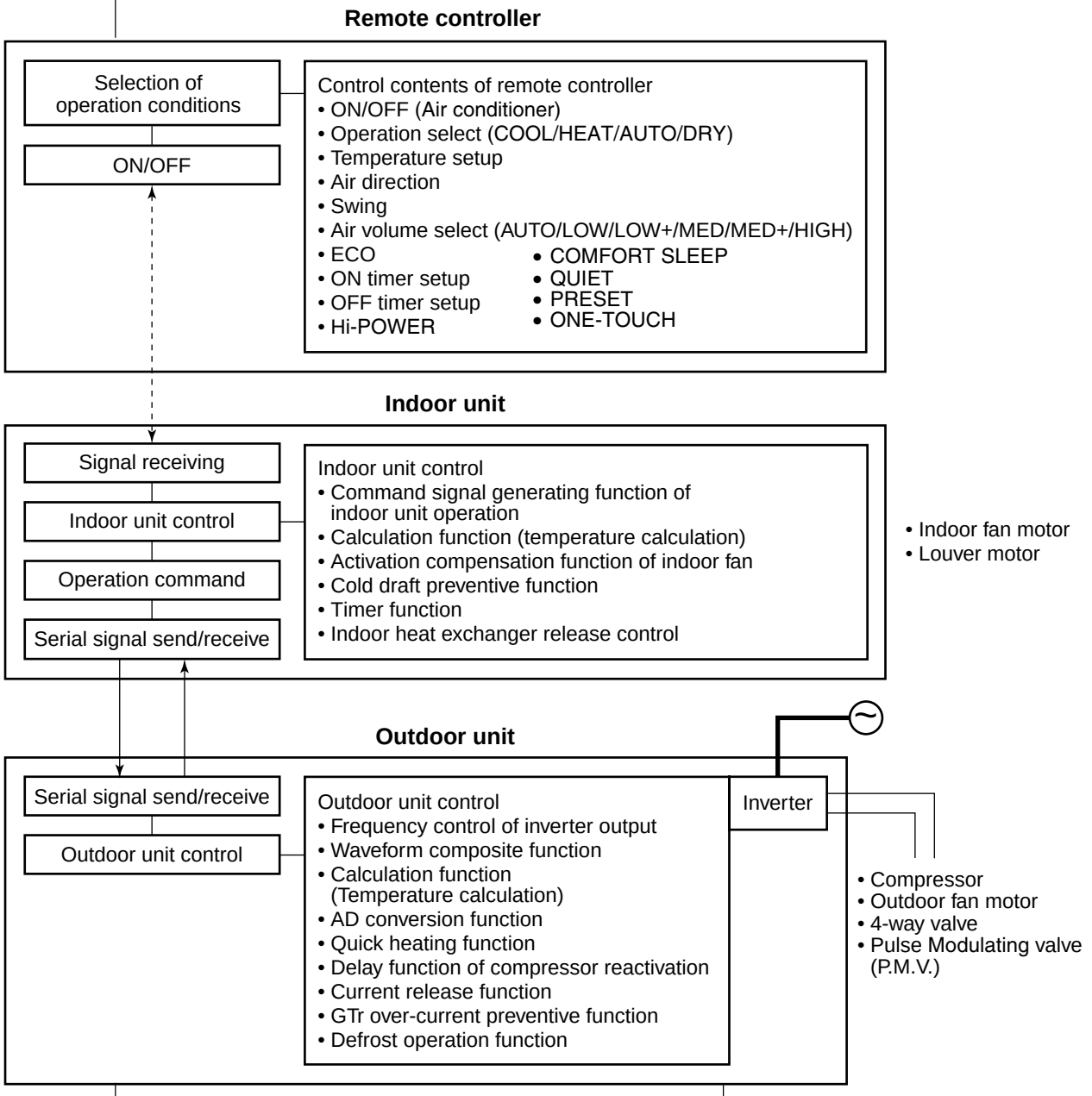
Item	Operation flow and applicable data, etc.	Description
1. Basic operation	1. Operation control	

Receiving the user's operation condition setup, the operation statuses of indoor/outdoor units are controlled.

1) The operation conditions are selected by the remote controller as shown in the below.
2) A signal is sent by ON button of the remote controller.
3) The signal is received by a sensor of the indoor unit and processed by the indoor controllers as shown in the below.
4) The indoor controller controls the indoor fan motor and louver motor.
5) The indoor controller sends the operation command to the outdoor controller, and sends/receives the control status with a serial signal.
6) The outdoor controller controls the operation as shown in the left, and also controls the compressor, outdoor fan motor, 4-way valve and pulse Modulating valve.



Item	Operation flow and applicable data, etc.	Description
1. Basic operation		

2. Operating mode selection when performing 2-room operation

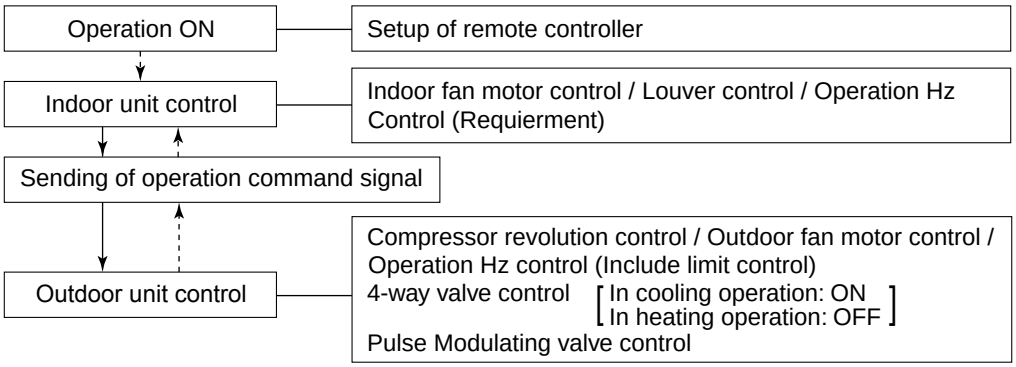
1) The outdoor unit operation mode conforms to the instructions of the indoor unit that was pressed first.
2) When combined operation consisting of cooling (dry) and heating, fan and heating, or cleaning operation and heating is performed, operation conforms to the instructions of the indoor unit that was pressed first as shown in the following table.
3) The indoor fan stops for the indoor unit that was pressed last and which instructions are ignored.
4) When three or four indoor units are operated concurrently, the priority is also given to operating mode of the indoor unit which was pressed first as same as the case when two indoor units are operated concurrently.

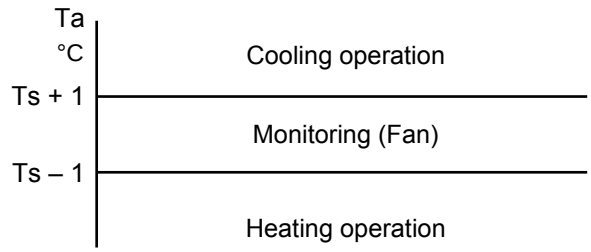
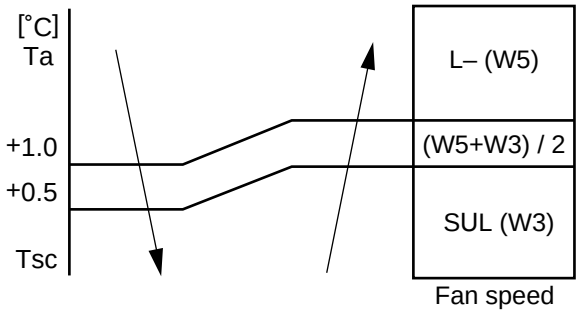
No.	Indoor unit	Set operating mode	Actual indoor unit operation	Actual outdoor unit operation
1	Pressed first	Cooling (dry)	Cooling (dry)	Cooling
	Pressed last	Cooling (dry)	Cooling (dry)	
2	Pressed first	Heating	Heating	Heating
	Pressed last	Heating	Heating	
3	Pressed first	Fan only	Fan only	Stopped
	Pressed last	Fan only	Fan only	
4	Pressed first	Fan only	Fan only	Cooling
	Pressed last	Cooling (dry)	Cooling (dry)	
5	Pressed first	Cooling (dry)	Cooling (dry)	Cooling
	Pressed last	Fan only	Fan only	
6	Pressed first	Cooling (dry)	Cooling (dry)	Cooling
	Pressed last	Heating	Fan stopped	
7	Pressed first	Heating	Heating	Heating
	Pressed last	Cooling (dry)	Fan stopped	
8	Pressed first	Cleaning operation	Cleaning operation	Stopped
	Pressed last	Cleaning operation	Cleaning operation	
9	Pressed first	Cleaning operation	Cleaning operation	Cooling
	Pressed last	Cooling (dry)	Cooling (dry)	
10	Pressed first	Cooling (dry)	Cooling (dry)	Cooling
	Pressed last	Cleaning operation	Cleaning operation	
11	Pressed first	Cleaning operation	Cleaning operation	Stopped
	Pressed last	Fan only	Fan only	
12	Pressed first	Fan only	Fan only	Stopped
	Pressed last	Cleaning operation	Cleaning operation	
13	Pressed first	Cleaning operation	Cleaning operation	Stopped
	Pressed last	Heating	Fan stopped	
14	Pressed first	Heating	Heating	Heating
	Pressed last	Cleaning operation	Fan stopped	

3. Cooling/Heating operation

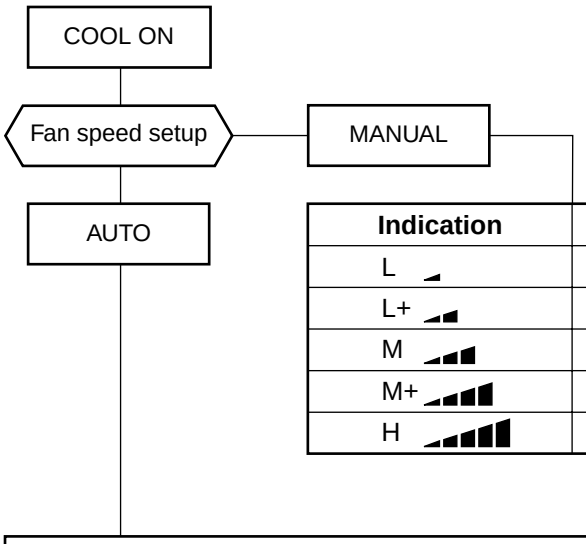
The operations are performed in the following parts by controls according to cooling/heating conditions.

1) Receiving the operation ON signal of the remote controller, the cooling or heating operation signal starts being transferred form the indoor controller to the outdoor unit.
2) At the indoor unit side, the indoor fan is operated according to the contents of "**2. Indoor fan motor control**" and the louver according to the contents of "**5. Louver control**", respectively.
3) The outdoor unit controls the outdoor fan motor, compressor, pulse Modulating valve and 4-way valve according to the operation signal sent from the indoor unit.


Operation ON
Setup of remote controller
Indoor unit control
Indoor fan motor control / Louver control / Operation Hz Control (Requierment)
Sending of operation command signal
Outdoor unit control
Compressor revolution control / Outdoor fan motor control / Operation Hz control (Include limit control)
4-way valve control
[In cooling operation: ON
In heating operation: OFF]
Pulse Modulating valve control

Item	Operation flow and applicable data, etc.	Description
1. Basic operation	**4. AUTO operation** Selection of operation mode As shown in the following figure, the operation starts by selecting automatically the status of room temperature (Ta) when starting AUTO operation. *1. When reselecting the operation mode, the fan speed is controlled by the previous operation mode. 	1) Detects the room temperature (Ta) when the operation started. 2) Selects an operation mode from Ta in the left figure. 3) Fan operation continues until an operation mode is selected. 4) When AUTO operation has started within 2 hours after heating operation stopped and if the room temperature is 20°C or more, the fan operation is performed with "Super Ultra LOW" mode for 3 minutes. Then, select an operation mode. 5) In AUTO mode, either cooling or heating operation will be selected. When room temperature reach set temperature commpressor will stop. In case that the compressor stops for 15 minutes, the AUTO mode will reselect cooling or heating operation.
	5. DRY operation DRY operation is performed according to the difference between room temperature and the setup temperature as shown below. In DRY operation, fan speed is controlled in order to prevent lowering of the room temperature and to avoid air flow from blowing directly to persons. 	1) Detects the room temperature (Ta) when the DRY operation started. 2) Starts operation under conditions in the left figure according to the temperature difference between the room temperature and the setup temperature (Tsc). Setup temperature (Tsc) = Set temperature on remote controller (Ts) + (0.0 to 1.0) 3) When the room temperature is lower 1°C or less than the setup temperature, turn off the compressor.

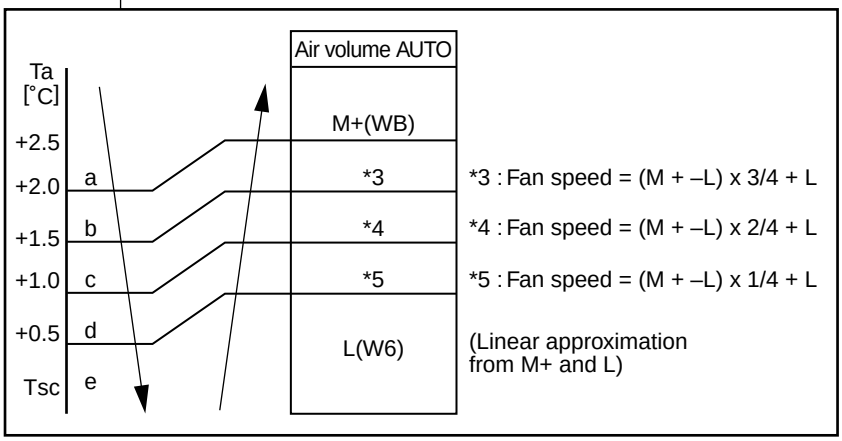
Item	Operation flow and applicable data, etc.	Description
2. Indoor fan motor control	**<In cooling operation>** (This operation controls the fan speed at indoor unit side.) The indoor fan (cross flow fan) is operated by the phase-control induction motor. The fan rotates in 5 stages in MANUAL mode, and in 5 stages in AUTO mode, respectively. (Table 1)	



(Fig. 1)

Indication	Fan speed
L	W6
L+	(L + M) / 2
M	W9
M+	(M + H) / 2
H	WC

(Fig. 2)



(Table 1) Indoor fan air flow rate

Fan speed level	COOL	HEAT	DRY	RAS-M07N3KV2-E	
				Fan speed (rpm)	Air flow rate (m3/h)
WF		UH		1240	630
WE		H		1170	582
WD	UH	M+	UH	1140	563
WC	H		H	1100	536
WB	M+	M+	M+	1000	469
WA			M	1000	469
W9	M	L+		960	443
W8		L		870	383
W7	L+	L-	L+	850	369
W6	L		L	760	309
W5	L-	UL	L-	760	309
W4	UL		UL	700	269
W3	SUL		SUL	650	236
W2		SUL		500	135
W1				500	135

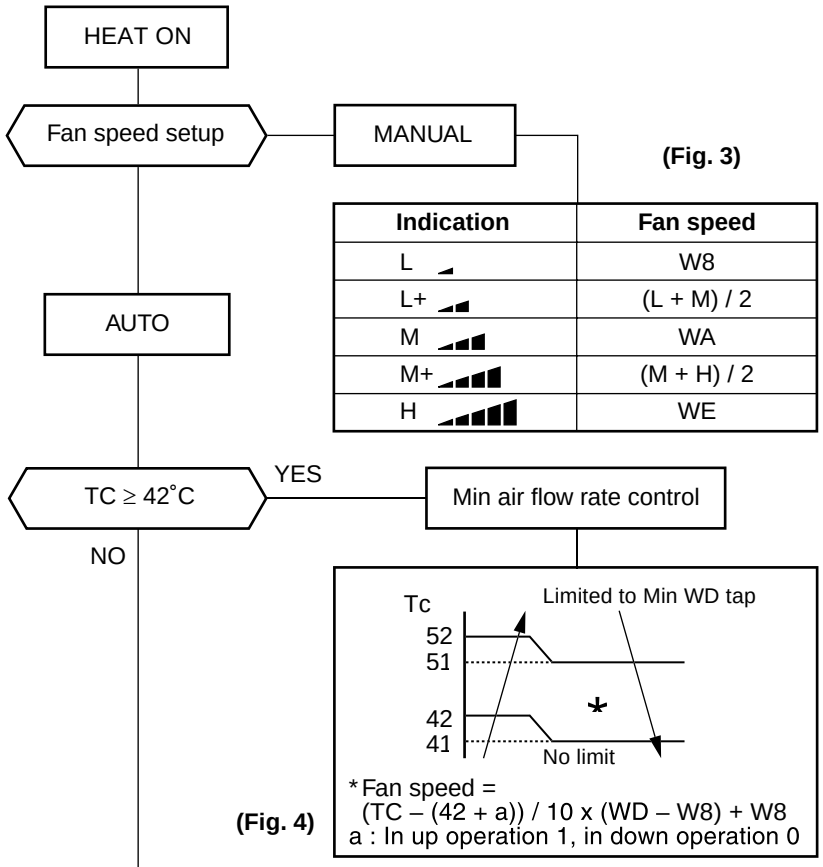
*** Symbols**

UH	: Ultra High
H	: High
M+	: Medium+
M	: Medium
L+	: Low+
L	: Low
L-	: Low–
UL	: Ultra Low
SUL	: Super Ultra Low

* The values of fan speed and air flow volume indicate on the table are measured when the louver is inclined downward. Fan speed and air flow volume broadly vary with position of louver.

1) When setting the fan speed to L, L+, M, M+ or H on the remote controller, the operation is performed with the constant speed shown in Fig. 1.
2) When setting the fan speed to AUTO on the remote controller, revolution of the fan motor is controlled to the fan speed level shown in Fig. 2 and Table 1 according to the setup temperature, room temperature, and heat exchanger temperature.

Item	Operation flow and applicable data, etc.	Description
2. Indoor fan motor control	**<In heating operation>**	1) When setting the fan speed to L, L+, M, M+ or H on the remote controller, the operation is performed with the constant speed shown in Fig. 3 and Table 1. 2) When setting the fan speed to AUTO on the remote controller, revolution of the fan motor is controlled to the fan speed level shown in Fig. 5 according to the set temperature and room temperature. 3) Min air flow rate is controlled by temperature of the indoor heat exchanger (Tc) as shown in Fig. 4 for prevent high temperature of heat exchanger. 4) Cold draft prevention, the fan speed is controlled by temperature of the indoor heat exchanger (Tc) as shown in Fig. 6 for keep warm temperature of air flow. 5) In order to prevent Cold draft when compressor step during heating operation. Then louver will move to upper position and fan speed will reduce or off.

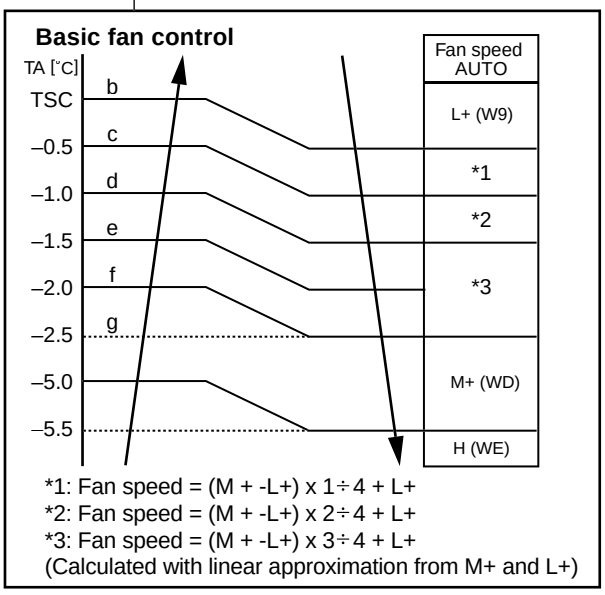


(Fig. 3)

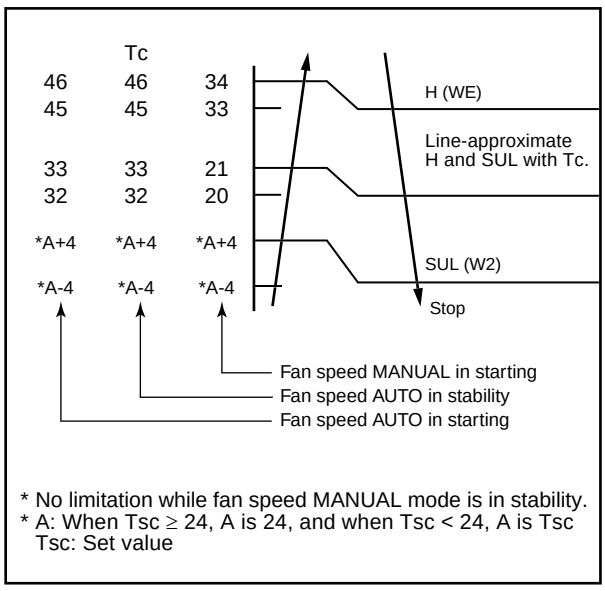
Indication	Fan speed
L	W8
L+	(L + M) / 2
M	WA
M+	(M + H) / 2
H	WE

(Fig. 4)

Cold draft preventive control



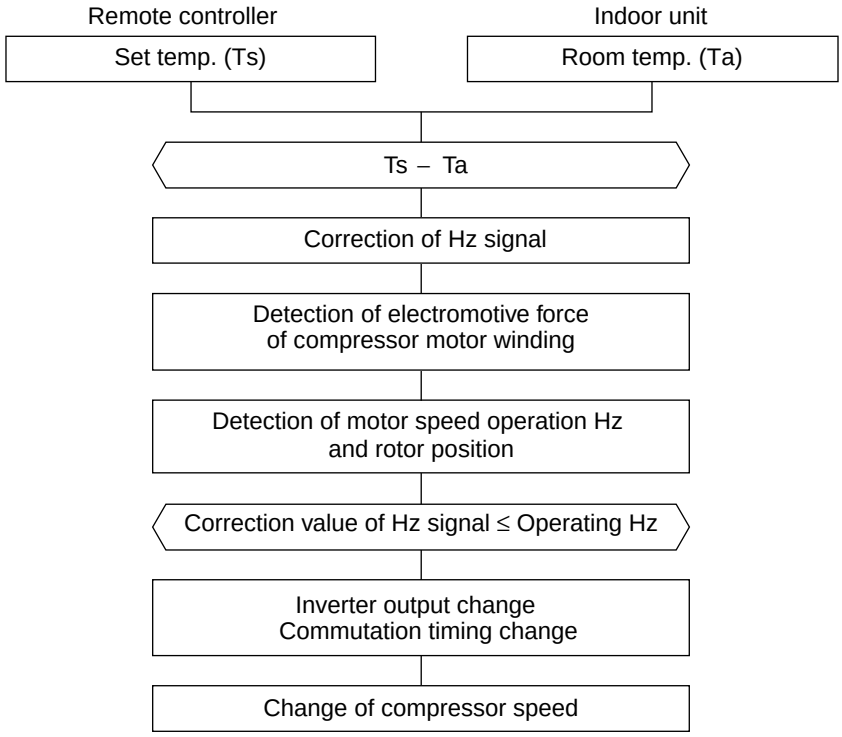
(Fig. 5)

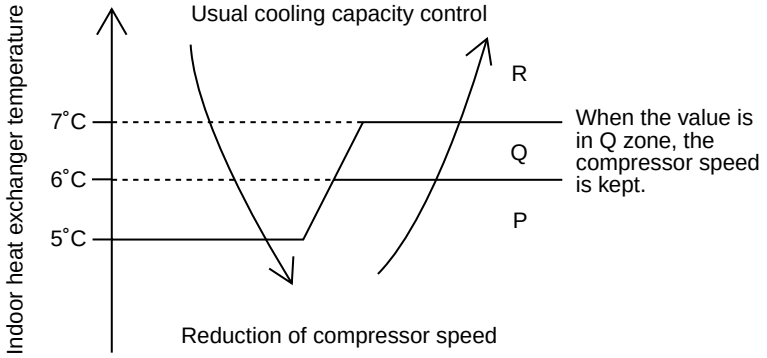
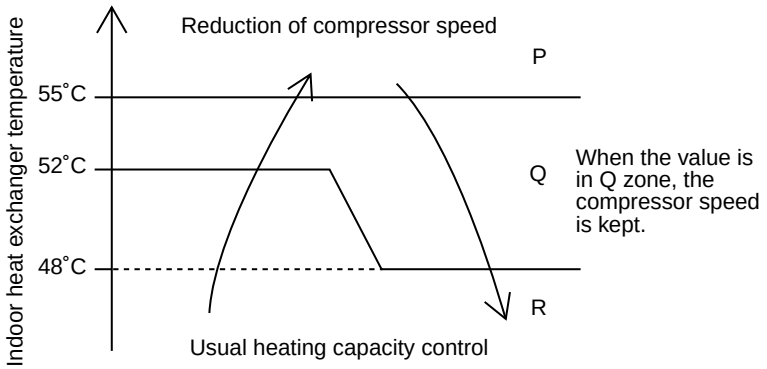


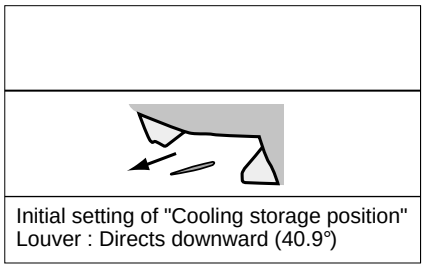
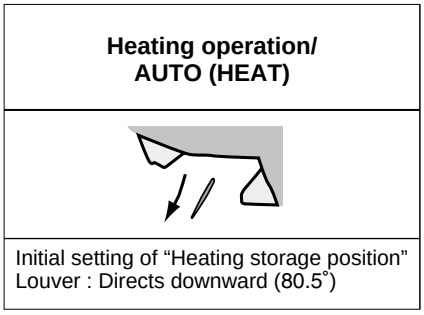
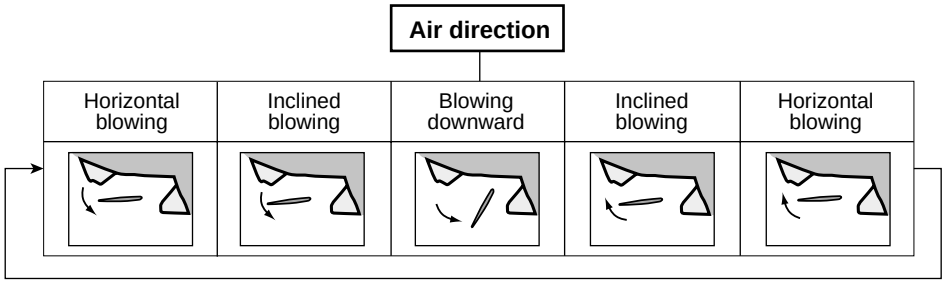
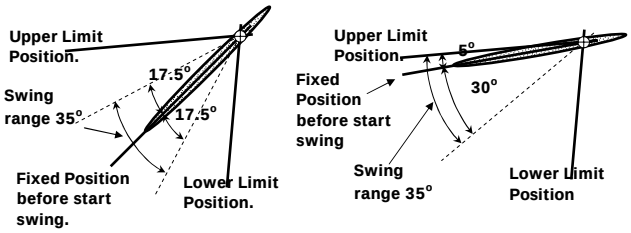
(Fig. 6)

[In starting and in stability]

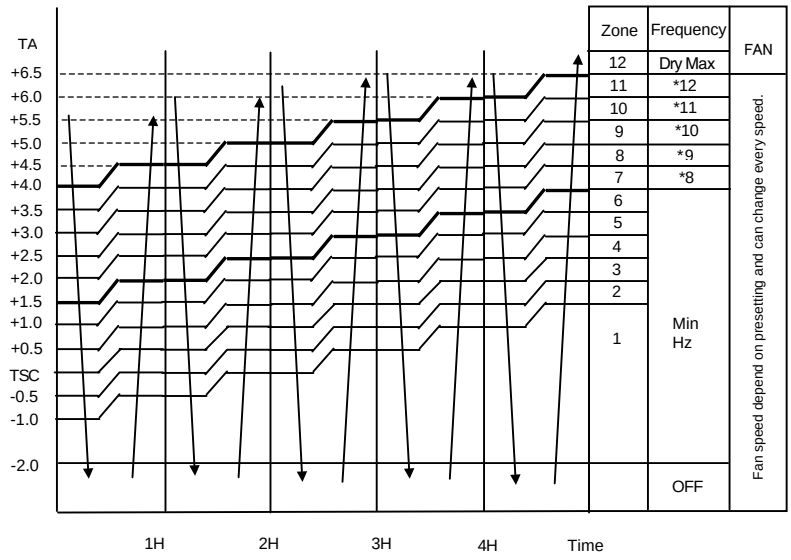
	In starting	In stability
FAN AUTO	• Until 12 minutes passed after operation start • When 12 to 25 minutes passed after operation start and room temp. is 3°C or lower than set temp.	• When 12 to 25 minutes passed after operation start and room temp. is higher than (set temp. –3°C) • When 25 minutes or more passed after operation start
FAN Manual	• Room temp. < Set temp. –4°C	• Room temp. ≥ Set temp. –3.5°C

Item	Operation flow and applicable data, etc.	Description
3. Capacity control	The cooling or heating capacity depending on the load is adjusted. According to difference between the setup value of temperature and the room temperature, the capacity is adjusted by the compressor revolution. 	1) The difference between set temperature on remote controller (Ts) and room temperature (Ta) is calculated. 2) According to the temperature difference, the correction value of Hz signal which determines the compressor speed is set up. 3) The rotating position and speed of the motor are detected by the electromotive force occurred on the motor winding with operation of the compressor. 4) According to the difference resulted from comparison of the correction value of Hz signal with the present operation Hz, the inverter output and the commutation timing are varied. 5) Change the compressor motor speed by outputting power to the compressor. * The contents of control operation are same in cooling operation and heating operation
Current release control	About "Current release control", Please refer to a service manual of connected Multi outdoor unit.	

Item	Operation flow and applicable data, etc.	Description
4. Release protective control by temperature of indoor heat exchanger	**<In cooling/dry operation>** (Prevent-freezing control for indoor heat exchanger) In cooling/dry operation, the sensor of indoor heat exchanger detects evaporation temperature and controls the compressor speed so that temperature of the heat exchanger does not exceed the specified value.  	1) When temperature of the indoor heat exchanger drops below 5°C, the compressor speed is reduced. (P zone) 2) When temperature of the indoor heat exchanger rises in the range from 6°C to under 7°C, the compressor speed is kept. (Q zone) 3) When temperature of the indoor heat exchanger rises to 7°C or higher, the capacity control operation returns to the usual control in cooling operation. (R zone)
	<In heating operation> (Prevent-overpressure control for refrigerating cycle) In heating operation, the sensor of indoor heat exchanger detects condensation temperature and controls the compressor speed so that temperature of the heat exchanger does not exceed the specified value.  	1) When temperature of the indoor heat exchanger rises in the range from 52°C to 55°C, the compressor speed is kept. (Q zone) When temperature of the indoor heat exchanger drops in the range from 48°C to under 55°C, the compressor speed is kept. (Q zone) 2) When temperature of the indoor heat exchanger rises to 55°C or higher, the compressor speed is reduced. (P zone) 3) When temperature of the indoor heat exchanger does not rise to 52°C, or when it drops below to 48°C, the capacity control operation returns to the usual control in heating operation. (R zone)

Item	Operation flow and applicable data, etc.	Description
5. Louver control 1) Louver position	This function controls the air direction of the indoor unit. • The position is automatically controlled according to the operation mode (COOL/HEAT). • The set louver position is stored in memory by the microcomputer, and the louver returns to the stored position when the next operation is performed. (Cooling/Heating memory position) The angle of the louver is indicated as the louver closes fully is 0°. 1) Louver position in cooling operation  Initial setting of "Cooling storage position" Louver : Directs downward (40.9°) 2) Louver position in heating operation  **Heating operation/ AUTO (HEAT)** Initial setting of "Heating storage position" Louver : Directs downward (80.5°)	
2) Air direction adjustment	 **Air direction** Horizontal blowing / Inclined blowing / Blowing downward / Inclined blowing / Horizontal blowing	• The louver position can be arbitrarily set up by pressing [FIX] button.
3) Swing	• Swing operation is perfor in range 35° with the Fixed position as the center. • If the swing range exceeded either upper or lower limit position, swing operation is performed in range 35° from the limit.  Upper Limit Position. / 17.5° / Swing range 35° / 17.5° / Fixed Position before start swing. / Lower Limit Position. Upper Limit Position. / 5° / Fixed Position before start swing / 30° / Swing range 35° / Lower Limit Position	• Swing When pressing [SWING] button during operation, the louver starts swinging.

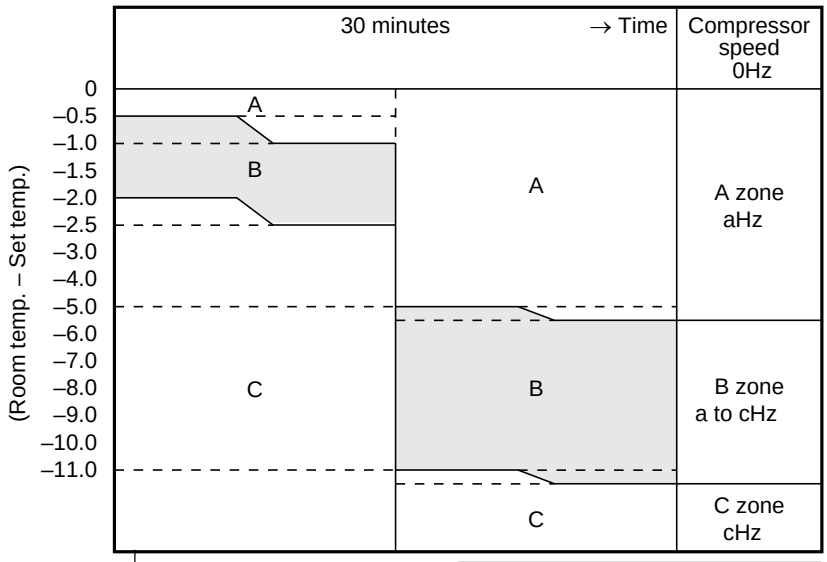
Item	Operation flow and applicable data, etc.	Description
6. ECO operation	When pressing [ECO] button on the remote controller, a Economic operation is performed. **<Cooling operation>** This function operates the air conditioner with the difference between the set and the room temperature as shown in the following figure.	**<Cooling operation>** 1) The control target temperature increase 0.5ºC per hour up to 2ºC starting from the set temperature when ECONO has been received. 2) The indoor fan speed is depend on presetting and can change every speed after setting ECO operation. 3) The compressor speed is controlled as shown in the left figure.



* 12 (DRY max - COOL min) /6 x 5 + COOL min
* 11 (DRY max - COOL min) /6 x 4 + COOL min
* 10 (DRY max - COOL min) /6 x 3 + COOL min
* 9 (DRY max - COOL min) /6 x 2 + COOL min
* 8 (DRY max - COOL min) /6 x 1 + COOL min

Hz	RAS-M07N3KV2-E
Cool min	20
DRY max	35

<Heating operation>

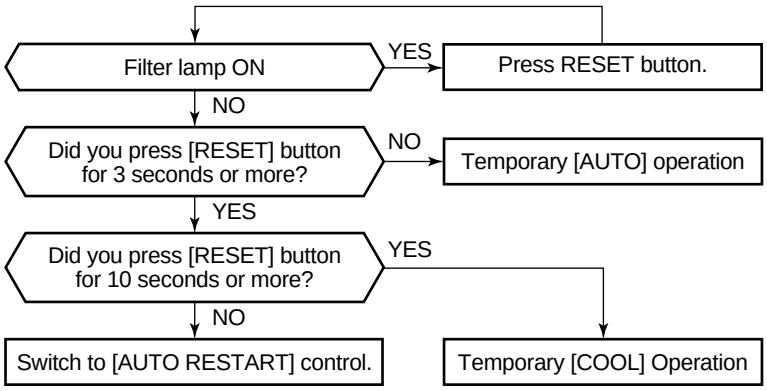


Hz	RAS-M07N3KV2-E
a	20
b	50

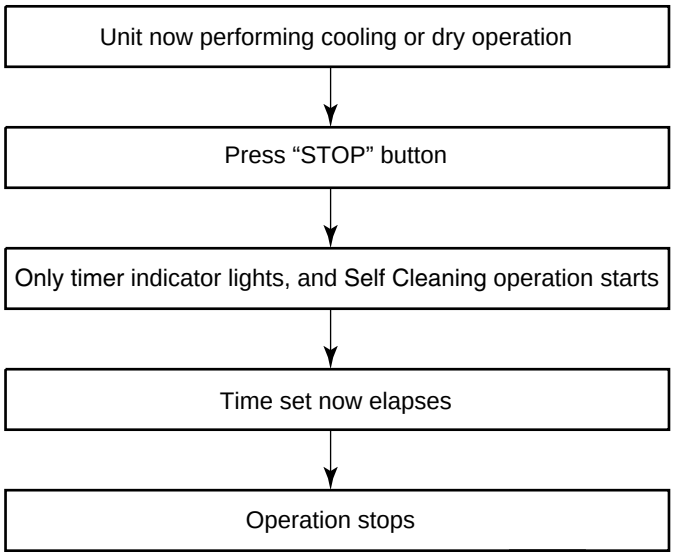
<Heating operation>

1) Setting the compressor speed to Max. aHz, the temperature zone in which the operation can be performed with Max. cHz is gradually widened after 30 minutes passed when starting ECO operation.
2) The indoor fan speed is depend on presetting and can change every speed after setting ECO operation.

Item	Operation flow and applicable data, etc.	Description
7. Temporary operation	Pressing [RESET] button starts the temporary operation of [AUTO] operation. When keeping [RESET] button pressed for 10 seconds or more, the temporary [COOL] operation is performed.	1) When pressing [RESET] button, the temporary [AUTO] operation starts. 2) When keeping [RESET] button pressed for 3 seconds or more, Pi, Pi, Pi sound is heard and [AUTO RESTART] control is changed. 3) When keeping [RESET] button pressed for 10 seconds or more, “Pi” sound is heard and the temporary [COOL] operation starts. 4) If the filter lamp goes on, press [RESET] button to go off the filter lamp, and then press [RESET] button again. 5) To stop the temporary operation, press the button again.



Item	Operation flow and applicable data, etc.	Description
8. Self-Cleaning function		**1. Purpose** The Self-Cleaning operation is to minimize the growth of mold, bacteria etc. by running the fan and drying so as to keep the inside of the air conditioner clean. **Self-Cleaning operation** When the cooling or dry operation shuts down, the unit automatically starts the Self-Cleaning operation which is then performed for the specified period based on duration of the operation which was performed prior to the shutdown, after which the Self-Cleaning operation stops. (The Self-Cleaning operation is not performed after a heating operation.) **2. Operation** 1) When the stop signal from the remote controller or timer-off function is received, only the timer indicator light. 2) The period of the Self-Cleaning operation is determined by the duration of the operation performed prior to the reception of the stop code. 3) After the Self-Cleaning operation has been performed for the specified period, the unit stops operating.


Unit now performing cooling or dry operation
Press “STOP” button
Only timer indicator lights, and Self Cleaning operation starts
Time set now elapses
Operation stops

- During Self-Cleaning operations: The louver opens slightly. The indoor fan operates continuously at a speed of 500 rpm.

Self-Cleaning operation times

	Operation time	Self-Cleaning operation time
Cooling: Auto (cooling) Dry	Up to 10 minutes	No Self-Cleaning operation performed (0 minutes)
	10 minutes or longer	30 mins.
Heating: Auto (heating)	No Self-Cleaning operation performed	
Auto (fan only)		
Shutdown		

- To stop an ongoing Self-Cleaning operation at any time
  Press the start/stop button on the remote controller twice during the Self-Cleaning operation. (After pressing the button for the first time, press it for the second time without delay (within 10 minutes).)

Item	Operation flow and applicable data, etc.	Description
9. Self-Cleaning function	• Self-Cleaning diagram	

Operation display	ON	OFF	OFF
FCU fan	ON rpm is depend on presetting.	ON (500RPM)	OFF
FCU louver	OPEN	OPEN (12.7º)	CLOSE
Timer display	ON or OFF depend on presetting of timer function.	ON	ON or OFF depend on presetting of timer function.
Compressor	ON or OFF depend on presetting per room temperature.	OFF	OFF
CDU fan	ON or OFF depend on presetting per room temperature.	OFF	OFF

Operation time

Cool mode or dry mode operation more than 10 mins.

Self-Cleaning mode operate 30 mins.

Turn off by remote controller or timer-off function.

Automatically turn-off.

How to Set or Cancel Self-Cleaning operation.
(Default setting from factory is ON)

1. Connect jumper lead at J201 of the indoor P.C. board assembly.

2. To cancel Self-Cleaning operation.

Turn the power supply ON

↓

Press the [RESET] button located on the front panel of the indoor unit for more than 3 seconds.

↓

After 3 seconds, the unit beeps three times.
The Self-Cleaning is cancelled.

3. To set Self-Cleaning operation.

Turn the power supply ON

↓

Press the [RESET] button located on the front panel of the indoor unit for more than 3 seconds.

↓

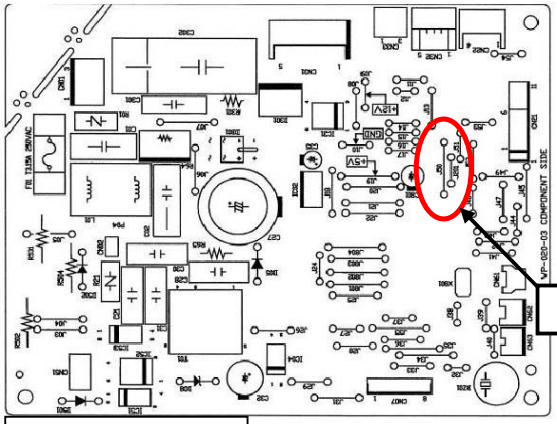
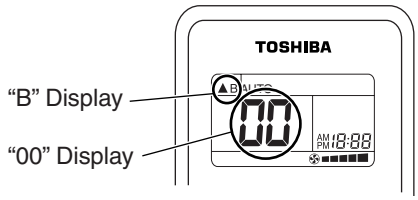
After 3 seconds, the unit beeps three times and the **indicator blinks for 5 seconds**.
The Self-Cleaning is set.

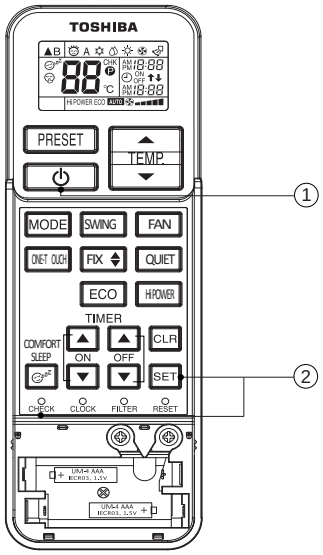
One J201 is added, it will effect as following.

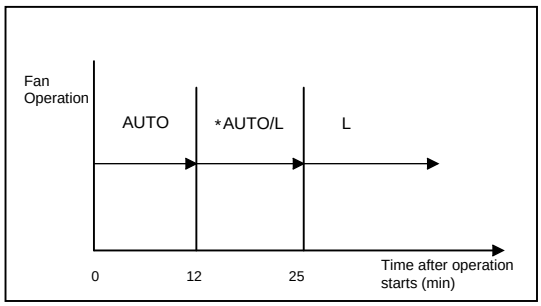
- The operation when press the RESET button for 3 seconds will be changed from Set/Cancel the AUTO-RESTART to Set/Cancel the Self-Cleaning.
- AUTO-RESTART function will not activate. In case of AUTO-RESTART is need, disconnect the jumper J201 and set it again after Set/Cancel the Self-Cleaning finished.

Note :

J201 is near the MCU, so so take steps to ensure that it will not be exposed to excessive of heat.
Also take care to avoid solder bridging with the surrounding components.

Item	Operation flow and applicable data, etc.	Description
	 PCB NO : WP-020	
10. Remote-A or B selection	**Setting the remote controller** To separate using of remote control for each indoor unit in case of 2 air conditioner are installed nearly. **Remote Control B Setup.** 1) Press RESET button on the indoor unit to turn the air conditioner ON. 2) Point the remote control at the indoor unit. 3) Push and hold CHK • button on the Remote Control by the tip of the pencil. "00" will be shown shown on the display. 4) Press MODE • during pushing CHK •. "B" will show on the display and "00" will disappear and the air conditioner will turn OFF. The Remote Control B is memorized. Note : 1. Repeat above step to reset Remote Control to be A. 2. Remote Control A has not "A" display. 3. Default setting of Remote Control from factory is A. 	**1. Purpose** This operation is to operate only one indoor unit using one remote controller. **2. Description** When operating one indoor unit in a situation where two indoor units have been installed in the same room or nearby rooms, this operation prevents the remote controller signal from being received simultaneously by both units, thus preventing both units from operating. **3. Operation** The indoor unit on which the remote controller selection has been set to B receives the signal of the remote controller also set to B. (At the factory the remote controller selection is set to A on all the indoor units. There is no A setting display.)

Item	Operation flow and applicable data, etc.	Description
11. QUIET mode	When the [QUIET] button is pressed, the fan of the indoor unit will be restricted the revolving speed at speed L− until the [QUIET] button is pressed once again (cancel Quiet mode).	Quiet mode is the system which, control the revolving speed of indoor fan to work constantly at lower than speed L. In addition, noise level of indoor unit is less than usual. Remarks : 1. Quiet mode is unable to work in dry mode. 2. Quiet mode is appropriate to work with less cooling load and less heating load condition. Because of the fan speed L- may cause not enough the cooling capacity or heating capacity.
12. COMFORT SLEEP	**Cooling mode** • The preset temperature will increase as show on ECO operation (Item No. 6) • Press the [COMFORT SLEEP] button to choose the operating hours. Repeat pressing to select the hours. (1hr, 3hr, 5hr or 9hr) • If the [COMFORT SLEEP] button is pressed again means cancel comfort sleep mode. **Heating mode** • The preset temperature will drop down as show on ECO operation (Item No. 6) • Press the [COMFORT SLEEP] button to choose the operating hours. Repeat pressing to setect thehours. (1hr, 3hr, 5hr or 9 hr) • If the [COMFORT SLEEP] button is pressed again means cancel comfort sleep mode.	The principles of comfort sleep mode are: • Quietness for more comfortable. When room temperature reach setting temperature • Save energy by changing room temperature automatically. • The air condition can shut down by itself automatically. Remarks: Comfort sleep mode will not operate in dry mode and fan only mode.
13. Short Timer	In the normal condition, after switching one circuit breaker, 3-minute delay time for compressor and 1 hour for plasma air purifier are set for the maintenance of the unit.  	**Purpose** To start the unit immediately for the purpose of testing, trial...etc, short timer can be used. maintenance of the unit. **Short Timer Setting** ① Press [⏻] button to turn the unit OFF. ② Set the operation mode or plasma air purifier on the remote control without sending the signal to the unit. ③ Use the tip of the pencil to push the [CHK] button and hold, "00" will show on display, them press [SET] button to make "00" disappear. ④ Press [⏻] button to turn the unit ON. ⑤ When short timer is activated, all setting on the remote operates immediately, besides, all indicatiors on front panel turns ON continuously for 3 seconds.

Item	Operation flow and applicable data, etc.	Description
14. One-Touch Comfort	One touch comfort is the fully automated operation that is set according to the preferable condition in a region.  *AUTO/L: Fan operates depends on the setting temperature and room temperature. During the One Touch Comfort mode if the indoor unit receives any signal with other operation mode, the unit will cancel the comfort mode and operates according to the signal received.	**Operation condition for model to Europe market** When an indoor unit receives "One Touch Comfort Signal" from the remote controller, the indoor unit operates as following. 1) Air conditioner starts to operation when the signal is received, even if the air conditioner was OFF. 2) Operation mode is set according to room temperature, the same as AUTO mode. 3) Target temperature is 24ºC. 4) Louver position is set as stored position of the operating mode. 5) Fan is controlled as followings.
15. Hi-POWER Mode	**([Hi-POWER] button on the remote controller is pressed)** When [Hi-POWER] button is pressed while the indoor unit is in Auto, Cooling or Heating operation, Hi-POWER mark is indicated on the display of the remote controller and the unit operates as follows. **1. Automatic operation** • The indoor unit operates in according to the current operation. **2. Cooling operation** • The preset temperature drops 1ºC (The value of the preset temperature on the remote controller does not change.) The indoor unit's fan speed level increase 1 tap **3. Heating operation** • The preset temperature increases 2ºC (The value of the preset temperature on the remote controller does not change.) The indoor unit's fan speed level increase 1 tap **4. The Hi-POWER mode can not be set in Dry operation**	∗ The Hi-POWER operation will be cancelled when press [Hi-POWER] button again.
16. FILTER Indicator	When the elapsed time reaches 1000 hours after air purifier operation, the FILTER indicator lights. After cleaning the filters, turn off the FILTER indicator. **How to Turn Off FILTER Indicator** Press [RESET] button on the indoor unit. **NOTE :** If [RESET] button is pushed while the FILTER indicator is not lit, the indoor unit will start the automatic operation.	

8-3. Auto Restart Function (Default setting from factory is ON).

This indoor unit is equipped with an automatic restarting function which allows the unit to restart operating with the set operating conditions in the event of a power supply being accidentally shut down.
The operation will resume without warning three minutes after power is restored.

This function is set to work from the factory.

The Auto Restart Function will not restart operation of the air conditioner in following case.

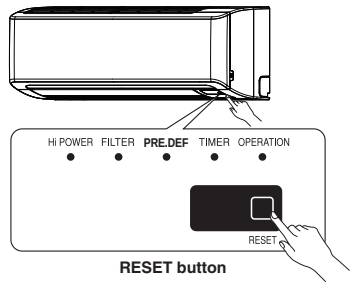
- The Auto Restart Function is setup to OFF.
- The power supply is shut down during the air conditioner is OFF.
- The power supply is shut down when timer operatio is set.

8-3-1. How to Cancel the Auto Restart Function

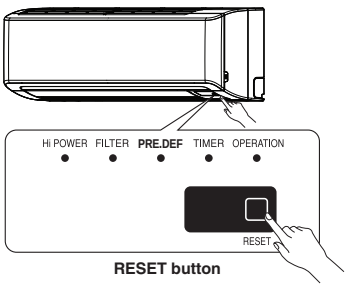
To cancel Auto Restart Function, proceed as follows.

1. The power supply to the unit must be ON ; The function will not set or reset if the power supply is OFF.
2. Press the [RESET] button located on the front panel of the indoor unit for more than 3 seconds.
3. After 3 seconds, the unit beeps three times.

• When the system is on stand-by (not operating)

Operation	Motions
Press [RESET] button for more than three seconds. (Less than 10 seconds)  **RESET button**	The unit is on standby. ↓ The unit starts to operate. The green indicator is on. ↓ After approx. three seconds, The unit beeps three times and continues to operate. If the unit is not required to operate at this time, press [RESET] button once more or use the remote controller to turn it off.

• When the system is operating

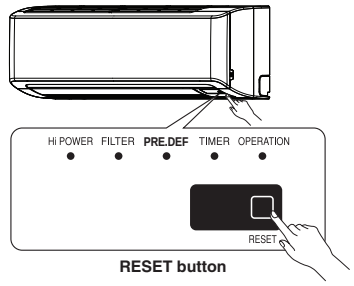
Operation	Motions
Press [RESET] button for more than three seconds. (Less than 10 seconds)  **RESET button**	The unit is in operation. The green indicator is on. ↓ The unit stops operating. The green indicator is turned off. ↓ After approx. three seconds, The unit beeps three times. If the unit is required to operate at this time, press [RESET] button once more or use the remote controller to turn it on.

8-3-2. How to Set the Auto Restart Function

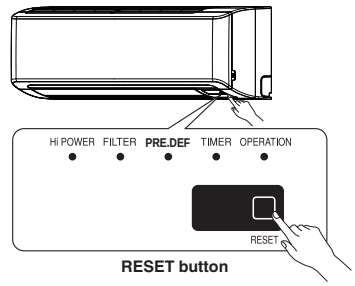
To set Auto Restart Function, proceed as follows:

1. The power supply to the unit must be ON ; The function will not set or reset if the power supply is OFF.
2. Press the [RESET] button located on the front panel of the indoor unit for more than 3 seconds.
3. After 3 seconds, the unit beeps three times and the indicator blinks for 5 seconds.

• When the unit is standby (Not operating)

Operation	Motions
Press [RESET] button for more than three seconds. (Less than 10 seconds)  **RESET button**	The unit is on standby. ↓ The unit starts to operate. The green indicator is on. ↓ After approx. three seconds, The unit beeps three times and continues to operate. **The green indicator flashes for 5 seconds.** If the unit is not required to operate at this time, press [RESET] button once more or use the remote controller to turn it off.

• When the unit is in operation

Operation	Motions
Press [RESET] button for more than three seconds. (Less than 10 seconds)  **RESET button**	The unit is in operation. The green indicator is on. ↓ The unit stops operating. The green indicator is turned off. ↓ After approx. three seconds, The unit beeps three times. **The green indicator flashes for 5 seconds.** If the unit is required to operate at this time, press [RESET] button once more or use the remote controller to turn it on.

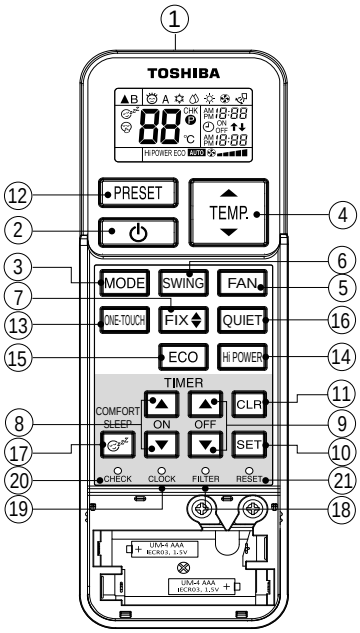
• While the filter check indicator is on, the RESET button has the function of filter reset betton.

8-3-3. Power Failure During Timer Operation

- If Timer operation is set and the power supply shut down accidentally, the previous Timer setting will be cancelled.
- Daily-Timer operation will be not affected by power supply failure, if the remote controller is located on the position which it can send the command signal to the indoor unit. It is because the remote controller will send signal every 30 minutes and Daily-Timer operation will be restore.

8-4. Remote control

8-4-1. Remote Controller and Its Functions



① Infrared signal emitter
② Start/Stop button
③ Mode select button (MODE)
④ Temperature button (TEMP)
⑤ Fan speed button (FAN)
⑥ Swing louver button (SWING)
⑦ Set louver button (FIX)
⑧ On timer button (ON)
⑨ Off timer button (OFF)
⑩ Setup button (SET)
⑪ Clear button (CLR)
⑫ Memory and Preset button (PRESET)
⑬ One-Touch button (ONE-TOUCH)
⑭ High power button (Hi-POWER)
⑮ Economy button (ECO)
⑯ Quiet button (QUIET)
⑰ Comfort sleep button (COMFORT SLEEP)
⑱ Filter reset button (FILTER)
⑲ Set clock button (CLOCK)
⑳ Check button (CHECK)
㉑ Reset button (RESET)

Note:

- The provided Remote Controller is a wireless type, which also can be used as a wire.
  Please see “How to Connect The Remote Controller for Wired Operation", located in installation instruction, in case of wired control is required.
- In wire operation, remote controller will return to initial condition (PRESET, TIMER and CLOCK will return to initial condition) when user shutdown power supply of Air conditioner.

8-4-2. Operation of remote control

1. ONE-TOUCH

Press the "ONE-TOUCH" button for fully automated operation that is customised to the typical consumer preferences in your region of the world. The coutomised settings control temperature air flow strength, air flow direction and other settings to provide you alternate contact with "ONE-TOUCH" OF THE BUTTON. If you prefer other settings you can select from the many other operation functions of your Toshiba unit

Press ONE-TOUCH : Start the operaton.

2. AUTOMATIC OPERATION

To automatically select cooling, or fan only operation.

1. Press MODE : Select A.
2. Press TEMP. : Set the desired temperature.

3. COOLING / HEATING / FAN ONLY OPERATION

To automatically select cooling, or fan only operation.

1. Press MODE : Select Cool ☼, Heat ☼, or Fan only .
2. Press TEMP. : Set the desired temperature.
   Cooling / Heating : Min 17°C - Max 30°C, Fan Only: No temperature indication
3. Press FAN : Select AUTO, LOW , LOW+ , MED , MED+ , or
   HIGH .

4. DRY OPERATION (COOLING ONLY)

For dehumidification, a moderate cooling performance is controlled automatically.

1. Press MODE : Select Dry .
2. Press TEMP : Set the desired temperature.

5. Hi-POWER OPERATION

To automatically control room temperature and airflow for faster cooling operation (except in DRY and FAN ONLY mode).

Press Hi-POWER : Start and stop the operation.

6. ECO OPERATION

To automatically control room to save energy (except in DRY and FAN ONLY mode)

Press ECO : Start and stop the operation.

Note: Cooling operation; the set temperature will increase automatically 0.5°C/hour for 4 hours (maximum 2 degrees increase).

7. TEMPORARY OPERATION

In case of the misplaced or discharged remote control

- Pressing the RESET button, the unit can start or stop without using the remote control.
- Operation mode is set on AUTOMATIC operation, preset temperature is 24°C and fan operation is automatic speed.

8. TIMER OPERATION

	Setting the ON Timer	Setting the OFF Timer
1	Press ▲ ON ▼ : Set the desired ON timer.	Press ▲ OFF ▼ : Set the desired OFF timer.
2	Press SET : Set the timer	Press SET : Set the timer.
3	Press CLR : Cancel the timer	Press CLR

Daily timer allows the user to set both the ON & OFF timers and will be activated on a daily basis.

Setting Daily Timer

1	Press ▲ ON ▼ : Set the ON timer.	3	Press SET.
2	Press ▲ OFF ▼ : Set the OFF timer.	4	Press SET button during the (⬆ or ⬇) mark flashing.

· During the daily timer is activation, both arrows (⬆ or ⬇)are indicated.

Note:

· Keep the remote control in accessible transmission to the indoor unit; otherwise, the time lag of up to 15 minutes will occur.

· The setting will be saved for the next same operation.

9. PRESET OPERATION

Set your preferred operation for future use. The setting will be memorized by the unit for future operation (except air flow direction).

1. Select your preferred operation.
2. Press and hold PRESET for 3 seconds to memorize the setting. The Ⓟ mark displays.
3. Press PRESET : Operate the preset operation.

10. AUTO RESTART OPERATION

To automatically restart the conditioner after the power failure (Power of the unit must be on.)

Setting

1. Press and hold the RESET button on the indoor unit for 3 seconds to set the operation. (3 beep sound and OPERATION lamp blink 5 time/sec for 5 seconds)
   - Do not operate ON timer and OFF timer.
2. Press and hold the RESET button on the indoor unit for 3 seconds to cancel the operation. (3 beep sound but OPERATION lamp does not blink)

11. QUIET OPERATION

To operate at super low fan speed for quiet operation (except in DRY mode)

Press QUIET : Start and stop the operation.

Note: Under certain conditions, QUIET operation may not provide adequate cooling due to low sound features.

12. COMFORT SLEEP OPERATION

To save energy while sleeping, automatically control air flow and automatically turn OFF.

Press COMFORT SLEEP : Select 1, 3, 5 or 9 hrs for OFF timer operation.

Note: The cooling operation, the set temperature will increase automatically 0.5 degree/hour for 4 hours (maximum 2 degrees increase).

8-4-3. Names and Functions of Indications on Remote Controller

[Display]

All indications, except for the clock time indicator, are displayed by pushing the ⏻ button.

1 Transmission mark

This transmission mark ▲ indicates when the remote controller transmits signals to the indoor unit.

2 Mode indicator

Indicates the current operation mode.
(AUTO : Automatic control, A : Auto changeover control, ☼ : Cool, 💧 : Dry, ☼ : Heat)

3 Temperature indicator

Indicates the temperature setting.
(17°C to 30°C)

4 FAN speed indicator

Indicates the selected fan speed.

AUTO or five fan speed levels
(LOW ▁ , LOW+ ▁▂ , MED ▁▂▃ , MED+ ▁▂▃▄ , HIGH ▁▂▃▄▅) can be shown.

Indicates AUTO when the operating mode is either AUTO or 💧 : Dry.

5 TIMER and clock time indicator

The time setting for timer operation or the clock time is indicated.

The current time is always indicated except during TIMER operation.

6 Hi POWER indicator

Indicates when the Hi POWER operation starts.

Push the Hi-POWER button to start and push it again to stop the operation.

7 Ⓟ (PRESET) indicator

Flashes for 3 seconds when the PRESET button is pushed during operation.

The Ⓟ mark is shown when holding down the button for more than 3 seconds while the mark is flashing.

Push another button to turn off the mark.

8 ECO indicator

Indicates when the ECO is in activated.

Push the ECO button to start and push it again to stop operation.

9 A, B change indicator remote controller

When the remote controller switching function is set, “B” appears in the remote controller display. (When the remote controller setting is “A”, there is no indication at this position.)

10 Comfort sleep

Indicates when comfort sleep is activaled.

Push comfort sleep button to select.

11 Quiet

Indicates when quiet is activated.

Push quiet button to start and push it again to stop operation.

12 One-Touch

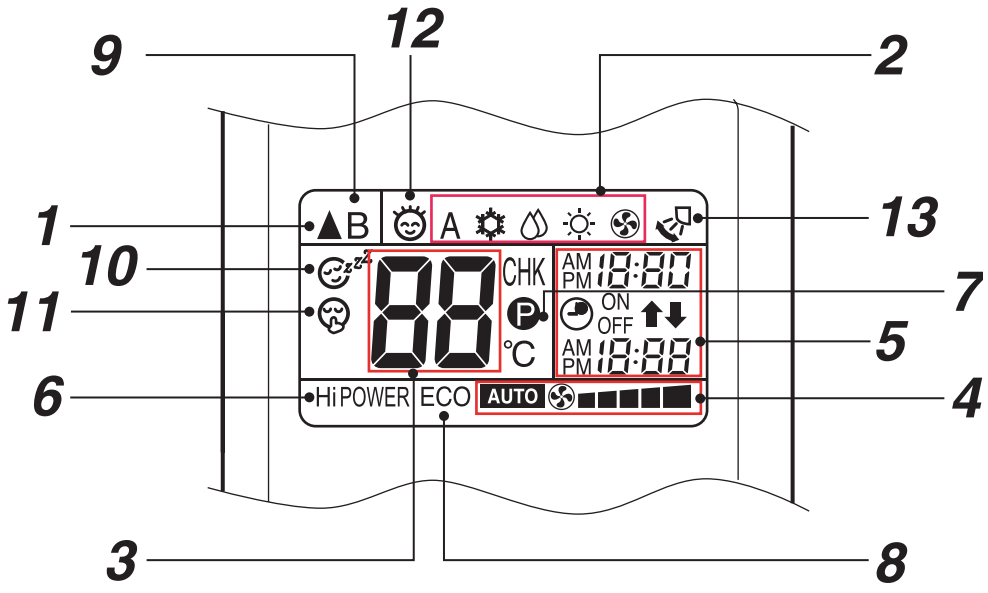
Indicates when one touch comfort is activated.

Push one-touch button to start the operation.

13 Swing

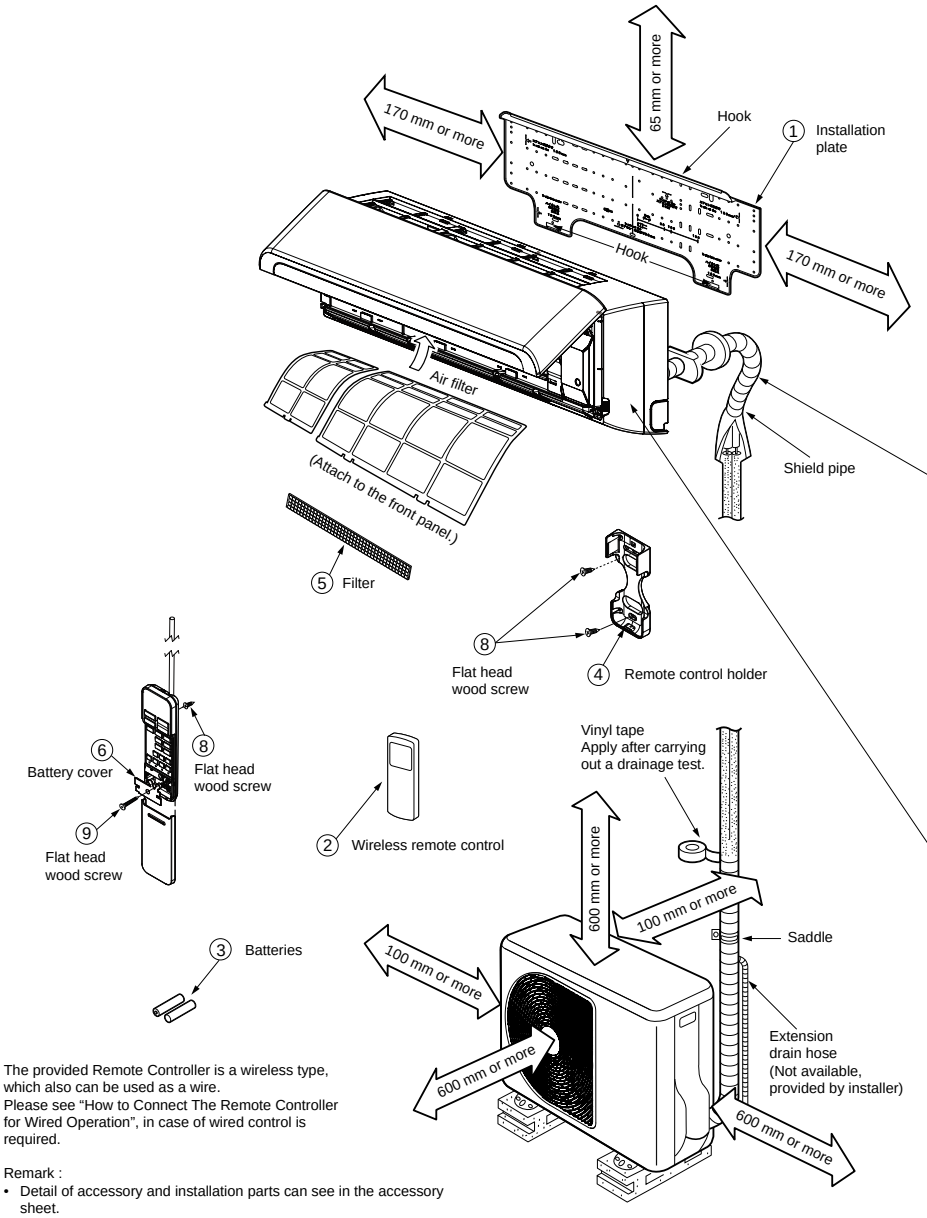
Indicates when louver is swing.

Push swing button to start the swing operation and push it again to stop the swing operation.



9. INSTALLATION PROCEDURE

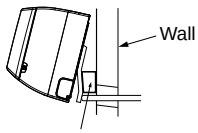
9-1. Installation Diagram of Indoor and Outdoor Units



The provided Remote Controller is a wireless type, which also can be used as a wire.
Please see "How to Connect The Remote Controller for Wired Operation", in case of wired control is required.

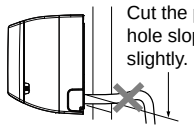
Remark :
- Detail of accessory and installation parts can see in the accessory sheet.
- Some pictures might be different from the actual parts.

For the rear left and left piping



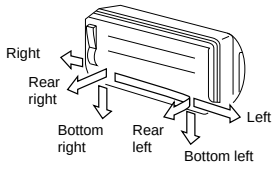
Insert the cushion between the indoor unit and wall, and tilt the indoor unit for better operation.

Do not allow the drain hose to get slack.

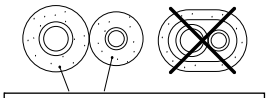


Make sure to run the drain hose sloped downward.

The auxiliary piping can be connected to the left, rear left, rear right, right, bottom right or bottom left.



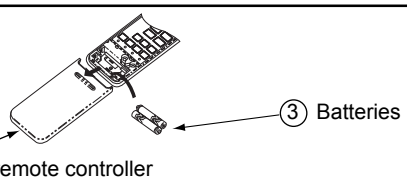
Insulate the refrigerant pipes separately with insulation, not together.



6 mm thick heat resisting polyethylene foam

Before installing the wireless remote controller

- Loading Batteries
  1. Remove the battery cover.
  2. Insert 2 new batteries (AAA type) following the (+) and (–) positions.



9-2. Installation

9-2-1. Optional installation parts

Part Code	Parts name	Q'ty
Ⓐ	Refrigerant piping Liquid side : ∅6.35 mm Gas side : ∅9.52 mm	One each
Ⓑ	Pipe insulating material (polyethylene foam, 6 mm thick)	1
Ⓒ	Putty, PVC tapes	One each

<Fixing bolt arrangement of outdoor unit>

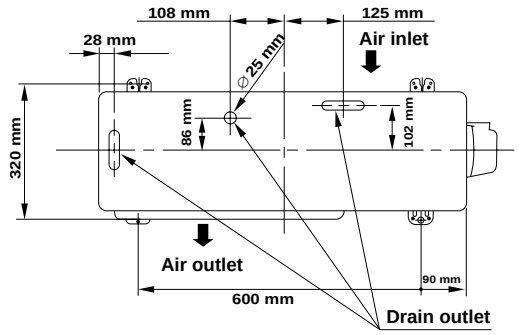
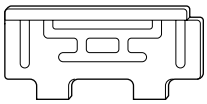
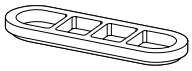


Fig. 9-2-1

- Secure the outdoor unit with fixing bolts and nuts if the unit is likely to be exposed to a strong wind.
- Use ∅8 mm or ∅10 mm anchor bolts and nuts.
- If it is necessary to drain the defrost water, attach drain nipple ⑩ and cap water proof ⑪ to the bottom plate of the outdoor unit before installing it.

9-2-2. Accessory and installation parts

Part No.	Part name (Q'ty)	Part No.	Part name (Q'ty)	Part No.	Part name (Q'ty)
①	 Installation plate x 1	⑤	Toshiba New IAQ filter (L) x 1	⑨	Flat head wood screw ∅3.1 x 25 ℓ x 1
②	Wireless remote control x 1	⑥	Battery-cover x 1	⑩	Drain nipple* x 1
③	Battery x 2	⑦	Mounting screw ∅4 x 25 ℓ x 6	⑪	 Cap water proof x 2
④	Remote control holder x 1	⑧	Flat head wood screw ∅3.1 x 16 ℓ x 2		

The part marked with asterisk (*) is packaged with the outdoor unit.

Others

Name
Owner's manual
Installation manual

9-2-3. Installation/Servicing Tools

Changes in the product and components

In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged accidentally, the service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping flare processing diameter and size of opposite side of flare nuts has been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

New tools for R410A

New tools for R410A	Applicable to R22 model		Changes
Gauge manifold	×		As pressure is high, it is impossible to measure by means of conventional gauge. In order to prevent any other refrigerant from being charged, each port diameter has been changed.
Charge hose	×		In order to increase pressure resisting strength, hose materials and port size have been changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to confirm the port size.
Electronic balance for refrigerant charging	○		As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal diam. 1/2, 5/8)	×		The size of opposite sides of flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	○		By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved.
Gauge for projection adjustment	—	—	Used when flare is made by using conventional flare tool.
Vacuum pump adapter	○		Connected to conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports-one for conventional refrigerant (7/16 UNF 20 threads per inch) and one for R410A. If the vacuum pump oil (mineral) mixes with R410A a sludge may occur and damage the equipment.
Gas leakage detector	×		Exclusive for HFC refrigerant.

- Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U. S's ARI specified rose color (ARI color code: PMS 507).
- Also, the "charge port and packing for refrigerant cylinder" require 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

9-3. Indoor Unit

9-3-1. Installation place

- A place which provides the spaces around the indoor unit as shown in the diagram in part 8-2.
- A place where there is no obstacle near the air inlet and outlet.
- A place that allows easy installation of the piping to the outdoor unit.
- A place which allows the front panel to be opened.
- The indoor unit shall be installed as top of the indoor unit comes to at least 2 m height. Also, it must be avoided to put anything on the top of the indoor unit.

CAUTION

- Direct sunlight to the indoor unit's wireless receiver should be avoided.
- The microprocessor in the indoor unit should not be too close to RF noise sources. (For details, see the owner's manual.)

<Remote control>

- A place where there are no obstacles such as a curtain that may block the signal from the indoor unit.
- Do not install the remote control in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Keep the remote control at least 1 m apart from the nearest TV set or stereo equipment. (This is necessary to prevent image disturbances or noise interference.)
- The location of the remote control should be determined as shown below.

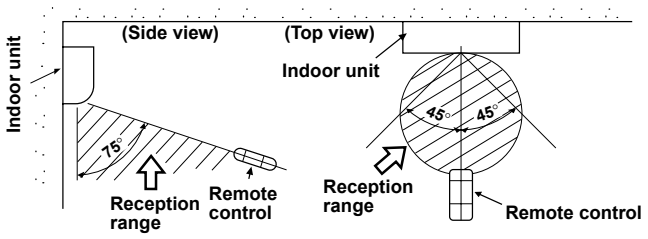


Fig. 9-3-1

9-3-2. Cutting a hole and mounting installation plate

<Cutting a hole>

When installing the refrigerant pipes from the rear.

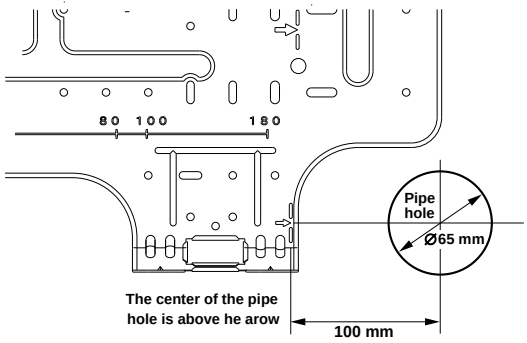


Fig. 9-3-2

1. After determining the pipe hole position on the mounting plate (➡), drill the pipe hole (∅65 mm) at a slight downward slant to the outdoor side.

NOTE

- When drilling a wall that contains a metal lath, wire lath or metal plate, be sure to use a pipe hole brim ring sold separately.

<Mounting the installation plate>

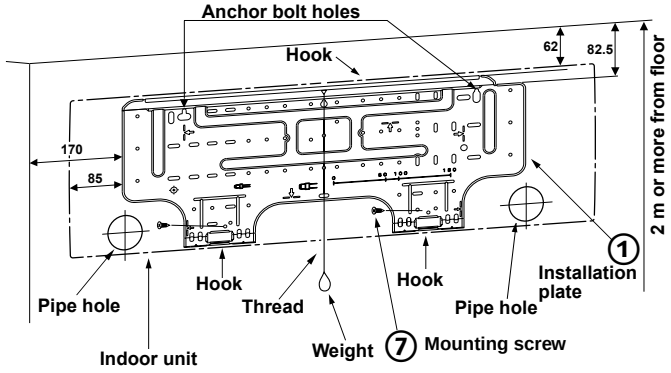


Fig. 9-3-3

<When the installation plate is directly mounted on the wall>

1. Securely fit the installation plate onto the wall by screwing it in the upper and lower parts to hook up the indoor unit.
2. To mount the installation plate on a concrete wall with anchor bolts, utilize the anchor bolt holes as illustrated in the above figure.
3. Install the installation plate horizontally in the wall.

CAUTION

When installing the installation plate with a mounting screw, do not use the anchor bolt hole. Otherwise the unit may fall down and result in personal injury and property damage.

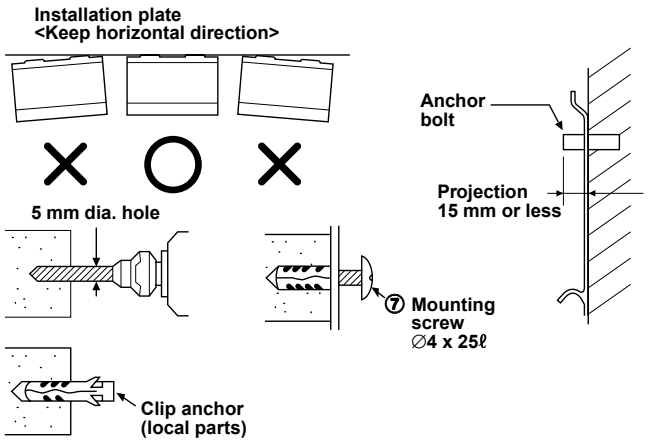


Fig. 9-3-4

CAUTION

Failure to firmly install the unit may result in personal injury and property damage if the unit falls.

- In case of block, brick, concrete or similar type walls, make 5 mm dia. holes in the wall.
- Insert clip anchors for appropriate ⑦ mounting screws.

NOTE

- Secure four corners and lower parts of the installation plate with 4 to 6 mounting screws to install it.

9-3-3. Wiring connection

<How to connect the connecting cable>

Wiring of the connecting cable can be carried out without removing the front panel.

1. Remove the air inlet grille.
   Open the air inlet grille upward and pull it toward you.
2. Remove the terminal cover and cord clamp.
3. Insert the connecting cable (according to the local cords) into the pipe hole on the wall.
4. Take out the connecting cable through the cable slot on the rear panel so that it protrudes about 20 cm from the front.
5. Insert the connecting cable fully into the terminal block and secure it tightly with screws.
6. Tighten firmly but not over 1.2 N.m (0.12 kgf.m)
7. Secure the connecting cable with the cord clamp.
8. Fix the terminal cover, rear plate bushing and air inlet grille on the indoor unit.

CAUTION

- Be sure to refer to the wiring system diagram labeled inside the front panel.
- Check local electrical cords and also any specific wiring instructions or limitations.

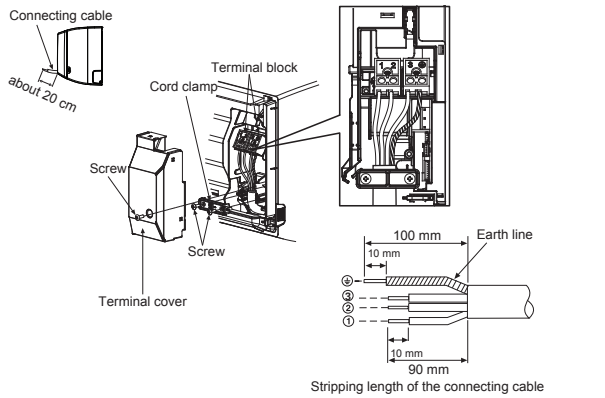


Fig. 9-3-5

NOTE

- Use stranded wire only.
- Wire type : More than H07RN-F or 60245 IEC66 (1.0 mm^2 or more)

<How to connect remote controller for wire operation>

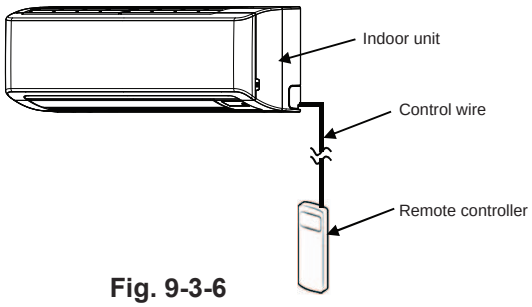


Fig. 9-3-6

For indoor unit

1. Open the air inlet grille upward.
2. Securely remove two screws at the front panel.
3. Slightly open the iower part of the front panel thon pull the upper part of the front toward you to remove it from the rear plate as shown on figure ①.
4. After removing the front panel, remove the display unit and open the cover as shown on figure ② and ③.
5. Arrange the control wire as detail and specification as shown on figure ④.
6. Securely connect the control wire to terminal of display unit board as shown on figure ⑤ (tighten firmly but not over : 0.12 N·m (0.01 kgf·m).
7. Set the control wire throughout at slot on front cover of display unit then reassembly display with main casing by reverse process of figure ② and ③. Make sure the control wire must not be pressed by front and rear cover of display unit.
8. Set the control wire out from indoor unit same portion as power supply and connecting cable as shown on figure ⑥.
9. Reassembly the indoor unit by reverse process of 1 to 3.

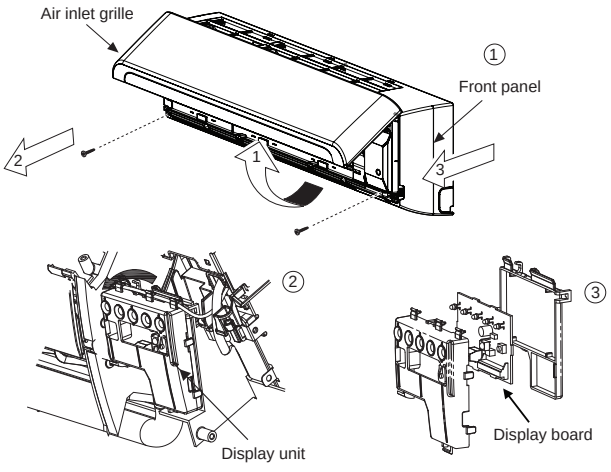


Fig. 9-3-7

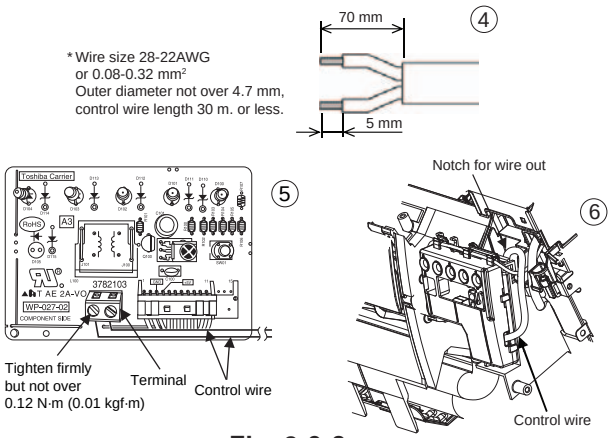


Fig. 9-3-8

For remote controller

1. Remove cover of remote controller by sliding down and take it out.
2. If batteries are exist, please take them out. The combination of using wire controller and batteries may cause of batteries explosion.
3. Make hole for insert control wire by use screwdriver break the polyester sheet as shown on figure ⑦.
4. Insert control wire from rear side of remote controller as shown on figure ⑧.
5. Fix control wire which arrange as shown on figure ⑨ and ⑩ to terminal by provided screws (tighten firmly but not over : 0.25 N·m (0.03 kgf·m).
6. Set control wire through gutter way at rear side of remote controller as shown on figure ⑪.
7. Fix provided screw (∅3.1 x 16L) on the wall to hang remote controller as shown on figure ⑫.
8. Mark and arrange hole for fix below screw (∅3.1 x 25L) as shown on figure ⑫.
9. Assembly battery cover which provided with accessory bag then use provide screw (∅3.1 x 25L) to fix battery cover together with wall as shown on figure ⑬ (tighten firmly but not over 0.15 N.m (0.02 kgf.m)).
10. Reassembly cover of remote controller.

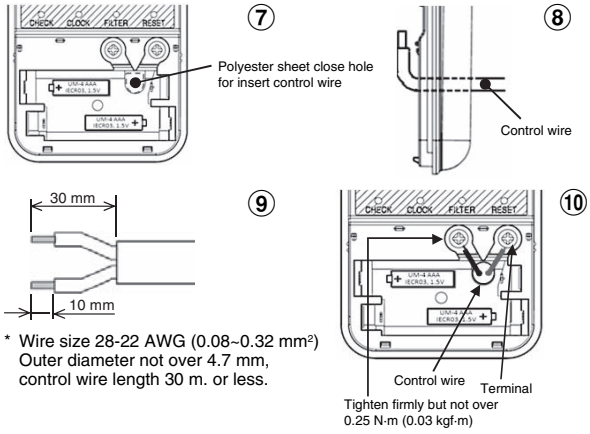


Fig. 9-3-9

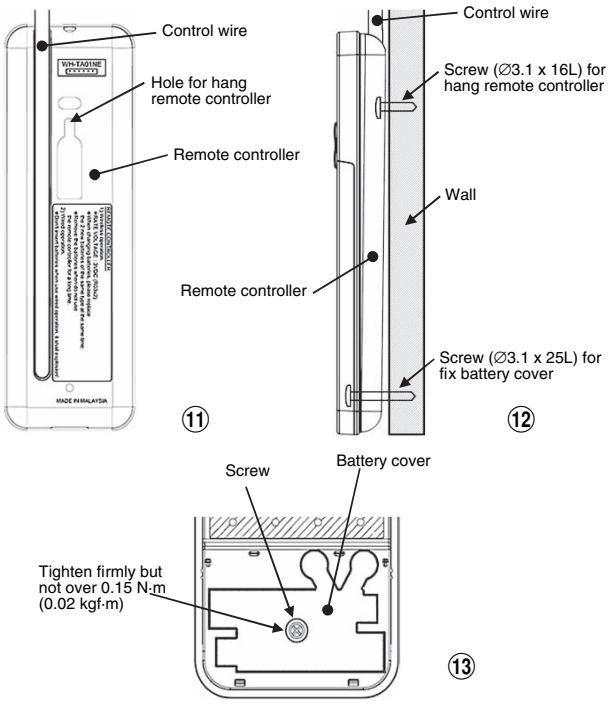


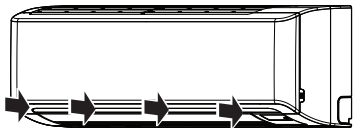
Fig. 9-3-10

***Remark :**

1. Recommend to use double insulation lead wire for connect remote control and air conditioner.
2. For wire operation, 1 remote control can control only 1 indoor unit.
3. In wire operation, remote controller will return to initial condition (PRESET, TIMER and CLOCK will return to initial condition) when user shutdown power supply of air conditioner.

<How to install the air inlet grille on the indoor unit>

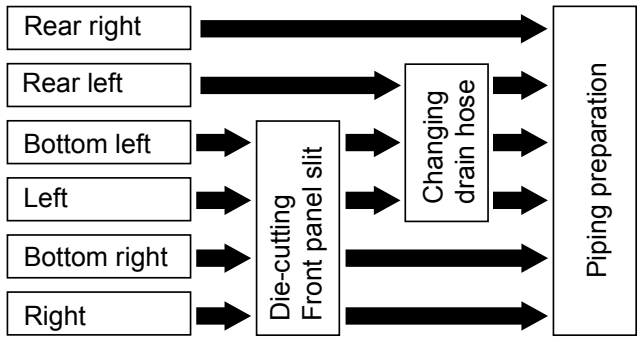
- When attaching the air inlet grille, the contrary of the removed operation is performed.



9-3-4. Piping and drain hose installation

<Piping and drain hose forming>

* Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.)



1. Die-cutting front panel slit

Cut out the slit on the left or right side of the front panal for the left or right connection and the slit on th bonttom left or right side of the front panel for the botto left or right connection with a pair of nippers.

2. Changing drain hose

For leftward connection, bottom leftward connection and rear leftward connection's piping, it is necessary to change the drain hose and drain cap.

How to remove the drains cap

Clip drain cap by needle-nose plier, and pull out.

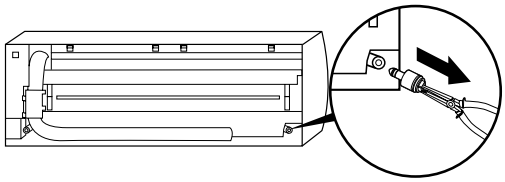


Fig. 9-3-11

How to install the drain hose

Firmly insert drain hose connecting part until hitting on a heat insulator and fix it with a screw.

How to remove the drain hose

- The drain hose can be removed by take off screw, after that twisting and pulling.
- When removing the drain hose, be careful of any sharp edges of steel plate. The edges can cause injuries.
- To install the drain hose, insert the drain hose firmly until the connection part contacts with heat insulator, and the secure it with original screw.

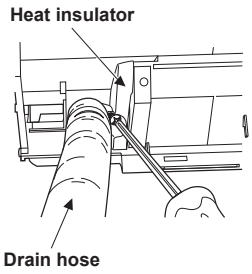


Fig. 9-3-12

How to fix the drains cap

1) Insert hexagonal wrench (4 mm) in a center head.

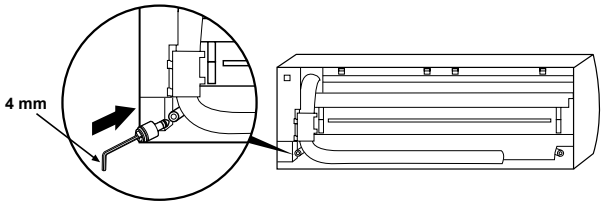


Fig. 9-13-13

2) Firmly insert drains cap.

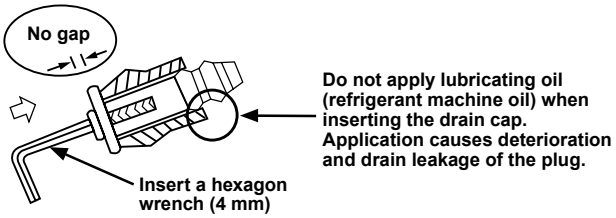

No gap
Do not apply lubricating oil (refrigerant machine oil) when inserting the drain cap. Application causes deterioration and drain leakage of the plug.
Insert a hexagon wrench (4 mm)

Fig. 9-13-14

CAUTION

Firmly insert the drain hose and drain cap; otherwise, water may leak.

<In case of right or left piping>

After scribing slits of the front panel with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool.

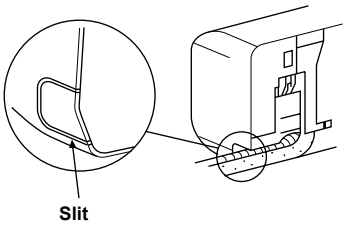


Fig. 9-13-15

<In case of bottom right or bottom left piping>

After scribing slits of the front panel with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool.

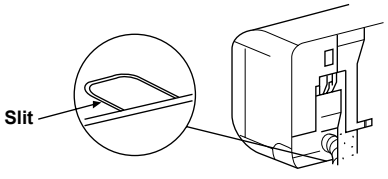


Fig. 9-13-16

<Left-hand connection with piping>

Bend the connecting pipe so that it is laid within 43 mm above the wall surface. If the connecting pipe is laid exceeding 43 mm above the wall surface, the indoor unit may unstably be set on the wall. When bending the connecting pipe, make sure to use a spring bender so as not to crush the pipe.

Bend the connection pipe within a radius of 30 mm.

To connect the pipe after installation of the unit (figure)

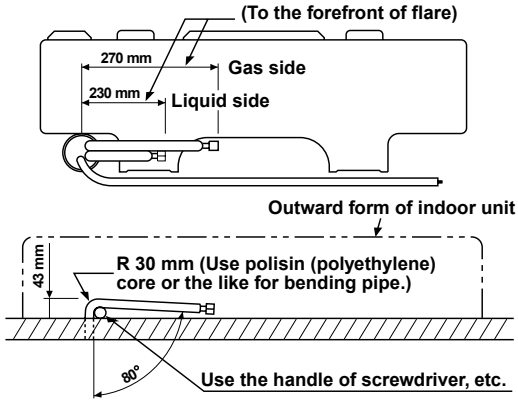

(To the forefront of flare)
270 mm
Gas side
230 mm
Liquid side
Outward form of indoor unit
43 mm
R 30 mm (Use polisin (polyethylene) core or the like for bending pipe.)
80°
Use the handle of screwdriver, etc.

Fig. 9-3-17

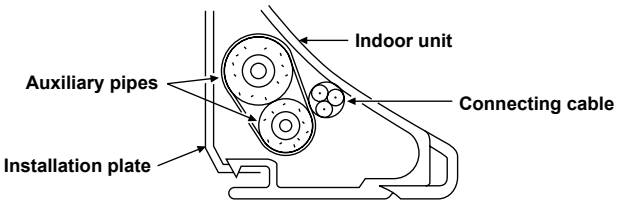
NOTE

If the pipe is bent incorrectly, the indoor unit may unstably be set on the wall.

After passing the connecting pipe through the pipe hole, connect the connecting pipe to the auxiliary pipes and wrap the facing tape around them.

CAUTION

Bind the auxiliary pipes (two) and connecting cable with facing tape tightly. In case of leftward piping and rear-leftward piping, bind the auxiliary pipes (two) only with facing tape.



Carefully arrange pipes so that any pipe does not stick out of the rear plate of the indoor unit.

Carefully connect the auxiliary pipes and connecting pipes to each other and cut off the insulating tape wound on the connecting pipe to avoid double-taping at the joint, moreover, seal the joint with the vinyl tape, etc.

Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.)

When bending a pipe, carefully do it, not to crush it.

9-3-5. Indoor unit fixing

1. Pass the pipe through the hole in the wall, and hook the indoor unit on the installation plate at the upper hooks.
2. Swing the indoor unit to right and left to confirm that it is firmly hooked up on the installation plate.
3. While pressing the indoor unit onto the wall, hook it at the lower part on the installation plate. Pull the indoor unit toward you to confirm that it is firmly hooked up on the installation plate.

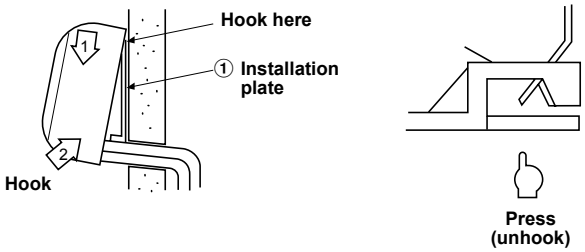


Fig. 9-3-18

For detaching the indoor unit from the installation plate, pull the indoor unit toward you while pushing its bottom up at the specified parts.

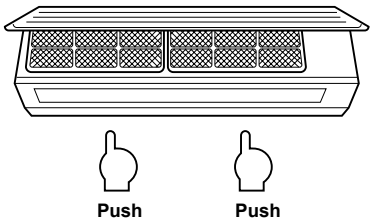


Fig. 9-3-19

9-3-6. Drainage

1. Run the drain hose sloped downwards.

NOTE

Hole should be made at a slight downward slant on the outdoor side.

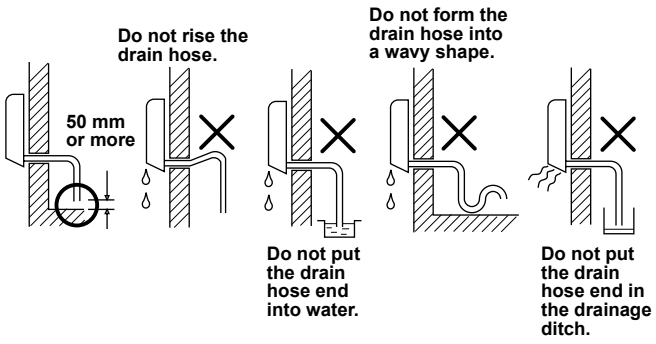

Do not rise the drain hose.
Do not form the drain hose into a wavy shape.
50 mm or more
Do not put the drain hose end into water.
Do not put the drain hose end in the drainage ditch.

Fig. 9-3-20

2. Put water in the drain pan and make sure that the water is drained out of doors.
3. When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.

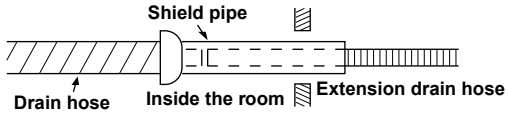


Fig. 9-3-21

CAUTION

Arrange the drain pipe for proper drainage from the unit.
Improper drainage can result in dew-dropping.

This air conditioner has the structure designed to drain water collected from dew, which forms on the back of the indoor unit, to the drain pan.
Therefore, do not store the power cord and other parts at a height above the drain guide.

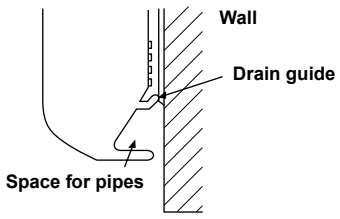


Fig. 9-3-22

9-4. Others

9-4-1. Remote Control A-B Selection

- When two indoor units are installed in the same room or adjacent two rooms, if operating a unit, two units may receive the remote control signal simultaneously and operate. In this case, the operation can be preserved by setting either one remote control to B setting. (Both are set to A setting in factory shipment.)
- The remote control signal is not received when the settings of indoor unit and remote control are different.
- There is no relation between A setting/B setting and A room/B room when connecting the piping and cables.

<Remote control A-B selection>

To separate using of remote control for each indoor unit in case of 2 air conditioners are installed nearly.

<Remote Control B Setup>

1. Press [RESET] button on the indoor unit to turn the air conditioner ON.
2. Point the remote control at the indoor unit.
3. Push and hold [CHECK] button on the Remote Control by the tip of the pencil. "00" will be shown on the display (Picture ①)
4. Press [MODE] during pushing [CHECK]. "B" will show on the display and "00" will disappear and the air conditioner will turn OFF. The Remote Control B is memorized [Picture ②).

NOTE : 1. Repeat above step to reset Remote Control to be A.
2. Remote Control A has not "A" display.
3. Default setting of Remote Control from factory is A.

Fig. 9-4-1

9-4-2. Test operation

To switch the TEST RUN (COOL) mode, press RESET button for 10 sec.
(The beeper will make a short beep.)

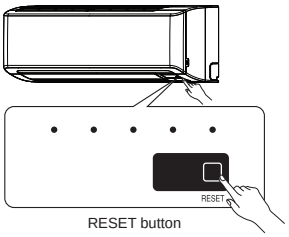


Fig. 9-4-2

9-4-3. Auto restart setting

This product is designed so that, after a power failure, it can restart automatically in the same operating mode as before the power failure.

Information

The product was shipped with Auto Restart function in the off position. Turn it on as required.

<How to set the auto restart>

1. Press and hold the [RESET] button on the indoor unit 3 seconds to set the operation. (3 beep sound and OPERATION lamp blink 5 time/sec for 5 seconds)
2. Press and hold the [RESET] button on the indoor unit for 3 seconds to cancel the operation. (3 beep sound but OPERATION lamp does not blink)
   - In case of ON timer or OFF timer are set, AUTO RESTART OPERATION dose not activate.

10. HOW TO DIAGNOSE THE TROUBLE

The pulse motor circuits are mounted to both indoor and outdoor units. Therefore, diagnose troubles according to the trouble diagnosis procedure as described below. (Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.)

Table 10-1

No.	Troubleshooting Procedure
1	First Confirmation
2	Primary Judgment
3	Judgment by Flashing LED of Indoor Unit
4	Self-Diagnosis by Remote Controller
5	Judgment of Trouble by Every Symptom

No.	Troubleshooting Procedure
6	How to Check Simply the Main Parts
7	Troubleshooting
8	How to Diagnose Trouble in Outdoor Unit
9	How to Check Simply the Main Parts
10	How to Simply Judge Whether Outdoor Fan Motor is Good or Bad

◆ Precautions when handling the new inverter (3DV Inverter)

⚠ CAUTION: HIGH VOLTAGEN

The high voltage circuit is incorporated.

Be careful to do the check service, as the electric shock may be caused in case of touching parts on the P.C. board by hand.

The new inverter (3DV inverter) will be incorporated starting with this unit.

(3DV: 3-shunt Discrete Vector control)

◆ The control circuitry has an uninsulated construction.

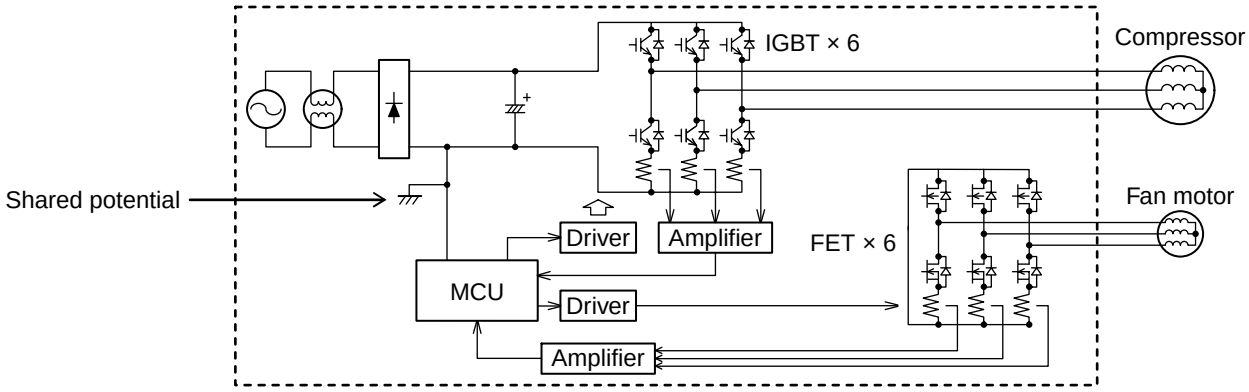


Fig. 10-1

⚠ CAUTION

A high voltage (equivalent to the supply voltage) is also energized to ground through the sensors, PMV and other low-voltage circuits. The sensor leads and other wires are covered with insulated tubes for protection. Nevertheless, care must be taken to ensure that these wires are not pinched.

Take sufficient care to avoid directly touching any of the circuit parts without first turning off the power.

At times such as when the circuit board is to be replaced, place the circuit board assembly in a vertical position.

Laying the board flat on an electrically conductive object (such as the top panel of the air conditioner's outdoor unit) while a charge is still retained by the electrolytic capacitors of the inverter's main circuit may cause short-circuiting between the electrolytic capacitors and secondary circuit components and result in damage to the components.

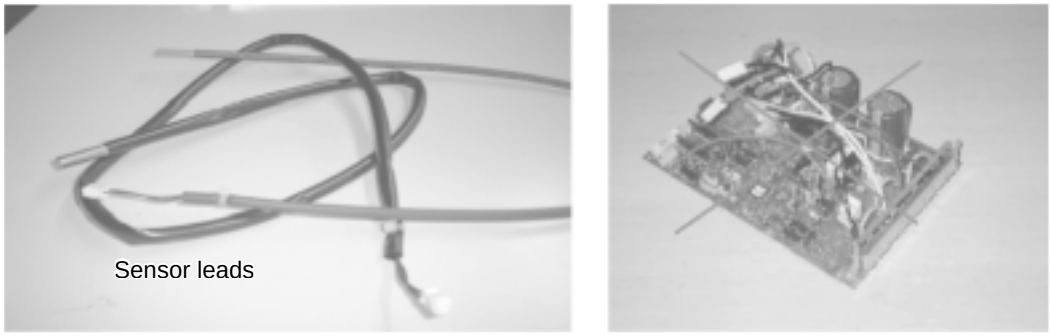


Fig. 10-2

Do NOT lay the circuit board assembly flat.

◆ Precautions when inspecting the control section of the outdoor unit

NOTE :

A large-capacity electrolytic capacitor is used in the outdoor unit controller (inverter). Therefore, if the power supply is turned off, charge (charging voltage DC280 to 380V) remains and discharging takes a lot of time. After turning off the power source, if touching the charging section before discharging, an electrical shock may be caused. Discharge the electrolytic capacitor completely by using soldering iron, etc.

< Discharging method >

1. Remove the inverter cover (plating) by opening four mounting claws.
2. As shown below, connect the discharge resistance (approx. 100Ω40W) or plug of the soldering iron to voltage between + – terminals of the C14 (“CAUTION HIGH VOLTAGE” is indicated.) electrolytic capacitor (500μF/400V or 760μF/400V) on P.C. board, and then perform discharging.

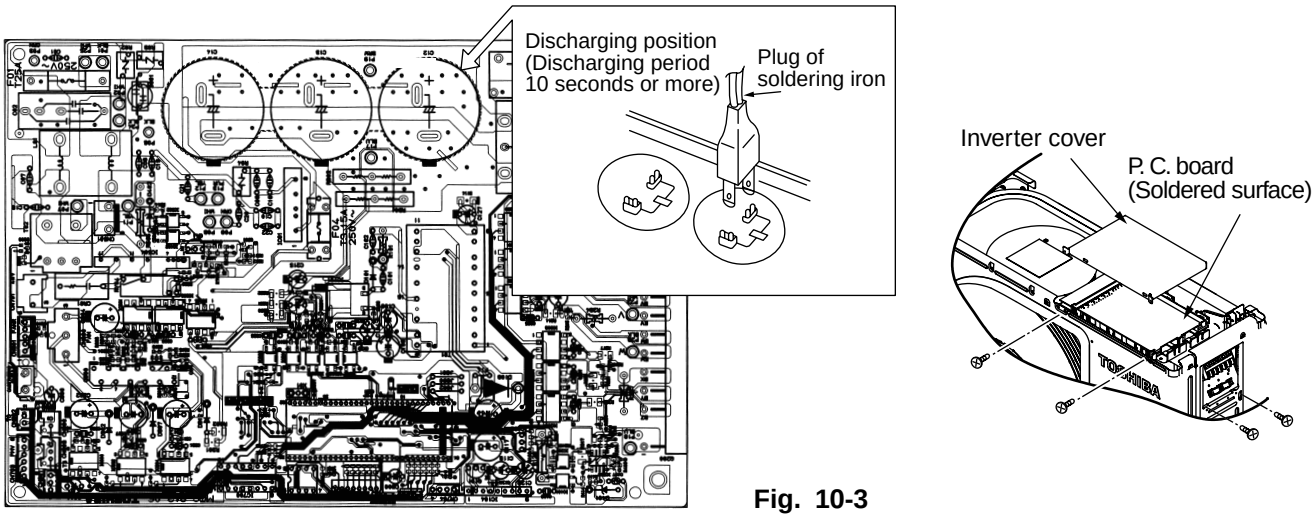


Fig. 10-3

10-1. First Confirmation

10-1-1. Confirmation of Power Supply

Confirm that the power breaker operates (ON) normally.

10-1-2. Confirmation of Power Voltage

Confirm that power voltage is AC 220–230–240 ± 10%.

If power voltage is not in this range, the unit may not operate normally.

10-1-3. Operation Which is not a Trouble (Program Operation)

For controlling the air conditioner, the program operations are built in the microcomputer as described in the following table.

If a claim is made for running operation, check whether or not it meets to the contents in the following table.

When it does, we inform you that it is not trouble of equipment, but it is indispensable for controlling and maintaining of air conditioner.

Table 10-1-1

No.	Operation of air conditioner	Description
1	When power breaker is turned “ON”, the operation indicator (Green) of the indoor unit flashes.	The OPERATION lamp of the indoor unit flashes when power source is turned on. If [⏻] button is operated once, flashing stops. (Flashes also in power failure)
2	Compressor may not operate even if the room temperature is within range of compressor-ON.	The compressor does not operate while compressor restart delay timer (3-minutes timer) operates. The same phenomenon is found after power source has been turned on because 3-minutes timer operates.
3	In Dry and ECO mode, FAN (air flow) display does not change even though FAN (air flow select) button is operated.	The air flow indication is fixed to [AUTO].
4	Increasing of compressor motor speed stops approx. 30 seconds after operation started, and then compressor motor speed increases again approx. 30 seconds after.	For smooth operation of the compressor, the compressor motor speed is restricted to Max. 41 rps for 2 minutes, and Max.91 rps for 2 minutes to 3 minutes, respectively after the operation has started.
5	In AUTO mode, the operation mode is changed.	After selecting Cool or Heat mode, select an operation mode again if the compressor keeps stop status for 15 minutes.
6	In HEAT mode, the compressor motor speed does not increase up to the maximum speed or decreases before the temperature arrives at the set temperature.	The compressor motor speed may decrease by high-temp. release control (Release protective operation by temp.-up of the indoor heat exchanger) or current release control.

10-2. Primary Judgment

To diagnose the troubles, use the following methods.

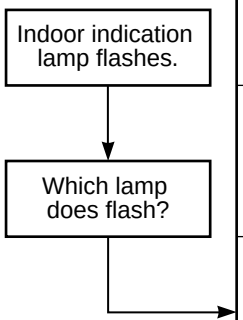
1) Judgment by flashing LED of indoor unit
2) Self-diagnosis by service check remote controller
3) Judgment of trouble by every symptom

Firstly use the method 1) for diagnosis. Then, use the method 2) or 3) to diagnose the details of troubles.

10-3. Judgment by Flashing LED of Indoor Unit

While the indoor unit monitors the operation status of the air conditioner, if the protective circuit operates, the contents of self-diagnosis are displayed with block on the indoor unit indication section.

Table 10-3-1



Item	Check code	Block display	Description for self-diagnosis
A	—	OPERATION (Green) Flashing display (1 Hz)	Power failure (when power is ON)
B	00	OPERATION (Green) Flashing display (5 Hz)	Protective circuit operation for indoor P.C. board
C	01	OPERATION (Green) TIMER (Yellow) Flashing display (5 Hz)	Protective circuit operation for connecting cable and serial signal system
D	02	OPERATION (Green) FILTER (Orange) Flashing display (5 Hz)	Protective circuit operation for outdoor P.C. board
E	03	OPERATION (Green) TIMER (Yellow) FILTER (Orange) Flashing display (5 Hz)	Protective circuit operation for others (including compressor)

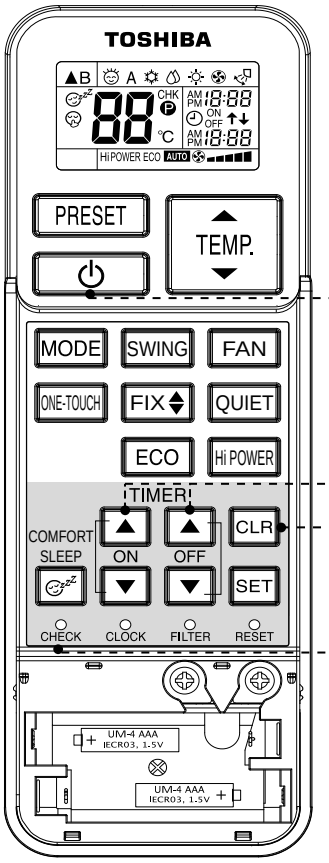
NOTES :

1. The contents of items B and C and a part of item E are displayed when air conditioner operates.
2. When item B and C, and item B and a part of item E occur concurrently, priority is given to the block of item B.
3. The check codes can be confirmed on the remote controller for servicing.

10-4. Self-Diagnosis by Remote Controller (Check Code)

1. If the lamps are indicated as shown B to E in Table 10-3-1, execute the self-diagnosis by the remote controller.
2. When the remote controller is set to the service mode, the indoor controller diagnoses the operation condition and indicates the information of the self-diagnosis on the display of the remote controller with the check codes. If a fault is detected, all lamps on the indoor unit will flash at 5Hz and it will beep for 10 seconds (Beep, Beep, Beep ...). The timer lamp usually flashes (5Hz) during self-diagnosis.

10-4-1. How to Use Remote Controller in Service Mode



Alphanumeric characters are used for the check codes.

5 is 5. 6 is 6.
A is A. b is B.
C is C. d is D.

1 **Press [CHECK] button with a tip of pencil to set the remote controller to the service mode.**

- " 00 " is indicated on the display of the remote controller.

2 **Press [ON ▲] or [OFF ▲] button**

If there is no fault with a code, the indoor unit will beep once (Beep) and the display of the remote controller will change as follows :

→ 00 → 01 → 02 ··· 1d → 1E → 33 →

- The TIMER indicator of the indoor unit flashes continuously. (5 times per 1 sec.)
- Check the unit with all 52 check codes (00 to 33) as shown in Table-10-4-1.
- Press [ON▼] or [OFF ▼] button to change the check code backward.

If there is a fault, the indoor unit will beep for 10 seconds (Beep, Beep, Beep...).

Note the check code on the display of the remote controller.

- 2-digits alphanumeric will be indicated on the display.
- All indicators on the indoor unit will flash. (5 times per 1 sec.)

3 **Press [CLR] button. After service finish for clear** service code in memory.

- "7F" is indicated on the display of the remote control.

4 **Press [⏻] button to release the service mode.**

- The display of the remote controller returns to as it was before service mode was engaged.

Fig. 9-4-1

10-4-2. Caution at Servicing

1. After servicing, press the [⏻] button to return to the normal mode.
2. After servicing by the check code, turn off breaker of the power supply, and turn on breaker of the power supply again so that memory in the microcomputer returns the initial status.

   However, the check codes are not deleted even if the power supply is turned off because they are stored in the fixed memory.
3. After servicing, press [CLR] button under check mode status and then send the check code “7F” to the indoor unit. The error code stored in memory is cleared.

Table 10-4-1

Block distinction		Operation of diagnosis function				Judgment and action
Check code	Block	Check code	Cause of operation	Air conditioner status	Remarks	
00	Indoor P.C. board etc.	0C	Short-circuit or disconnection of the room temperature sensor (TA sensor).	Operation continues.	Displayed when error is detected.	1. Check the room temp. sensor. 2. When the room temp. sensor is normal, check P.C. board.
		0d	Being out of place, disconnection, short-circuit, or migration of heat exchanger sensor (TC sensor)	Operation continues.	Displayed when error is detected.	1. Check heat exchanger sensor. 2. When heat exchanger sensor is normal, check P.C. board.
		11	Lock of indoor fan or trouble on the indoor fan circuit	All off	Displayed when error is detected.	1. Check the motor. 2. When the motor is normal, check P.C. board.
	Not displayed	12	Trouble on other indoor P.C. boards	Operation continues.	Displayed when error is detected.	Replace P.C. board.
01	Connecting cable and serial signal	04	Return serial signal is not sent to indoor side from operation started. 1) Defective wiring of connecting cable 2) Operation of compressor thermo Gas shortage Gas leak	Operation continues.	Flashes when trouble is detected on Return serial signal, and normal status when signal is reset.	1. When the outdoor unit never operate: 1) Check connecting cable, and correct if defective wiring. 2) Check 25A fuse of inverter P.C. board. 3) Check 3.15A of inverter P.C. board. 2. To display [Other] block during operation, check compressor thermo. operation and supply gas (check gas leak also). 3. Unit operates normally during check. If return serial signal does not stop between indoor terminal 2 and 3, replace inverter P.C. board. If signal stops between indoor terminal 2 and 3, replace indoor P.C. board.

Block distinction		Operation of diagnosis function				Judgment and action
Check code	Block	Check code	Cause of operation	Air conditioner status	Remarks	
02	Outdoor P.C. board	14	Inverter over-current protective circuit operates. (Short time)	All off	Displayed when error is detected.	Even if trying operation again, all operations stop immediately. : Replace P.C. board.
		16	Position-detect circuit error or short-circuit between windings of compressor	All off	Displayed when error is detected.	1. Even if connecting lead wire of compressor is removed, position-detect circuit error occurred. : Replace P.C. board. 2. Measure resistance between wires of compressor, and perform short-circuit. : Replace compressor.
		17	Current-detect circuit error	All off	Displayed when error is detected.	Even if trying operation again, all operations stop immediately. : Replace P.C. board.
		18	Being out of place, disconnection or short-circuit of the outdoor heat exchanger sensor (TE) or suction temp. sensor (Ts)	All off	Displayed when error is detected.	1. Check sensors (TE, TS). 2. Check P.C. board.
		19	Disconnection or short-circuit of discharge temp. sensor	All off	Displayed when error is detected.	1. Check discharge temp. sensor (TD). 2. Check P.C. board
		1A	Outdoor fan drive system error	All off	Displayed when error is detected.	Position-detect error, over-current protective operation of outdoor fan drive system, fan lock, etc. : Replace P.C. board or fan motor.
	Not displayed	1b	Outdoor heat exchanger temp. sensor error	Operation continues	——	1. Check outdoor temp. sensor (TO). 2. Check P.C. board.
	Outdoor P.C. board	1C	Compressor drive output error, Compressor error (lock, missing, etc.), Break down	All off	Displayed when error is detected.	When 20 seconds passed after start-up, position-detect circuit error occurred. : Replace compressor. Trouble on P.M.V.
03	Others (including compressor)	07	Return serial signal has been sent when operation started, but it is not sent from halfway. 1) Compressor thermo. operation Gas shortage Gas leak 2) Instantaneous power failure	Operation continues	Flashes when trouble is detected on return serial signal, and normal status when signal is reset.	1. Repeat Start and Stop with interval of approx. 10 to 40 minutes. (Code is not displayed during operation.) Supply gas. (Check also gas leak). 2. Unit operates normally during check. If return serial signal does not stop between indoor terminal block 2 and 3, replace inverter P.C. board. If signal stops between indoor terminal block 2 and 3, replace indoor P.C. board.
		1d	Compressor does not rotate. (Current protective circuit does not operate when a specified time passed after compressor had been activated.)	All off	Displayed when error is detected.	1. Trouble on compressor 2. Trouble on wiring of compressor (Missed phase)
		1E	Discharge temp. exceeded 117°C	All off	Displayed when error is detected.	1. Check dischage temp. sensor (TD). 2. Gas leakage 3. Trouble on P.M.V.
		1F	Break down of compressor	All off	Displayed when error is detected.	1. Check power voltage. (220–230–240 V +10%) 2. Overload operation of refrigeration cycle Check installation condition (Short-circuit of outdoor diffuser).
		08	4-way valve inverse error (TC sensor value lowered during heating operation.)	Operation continues	——	1. Check 4-way valve operation.

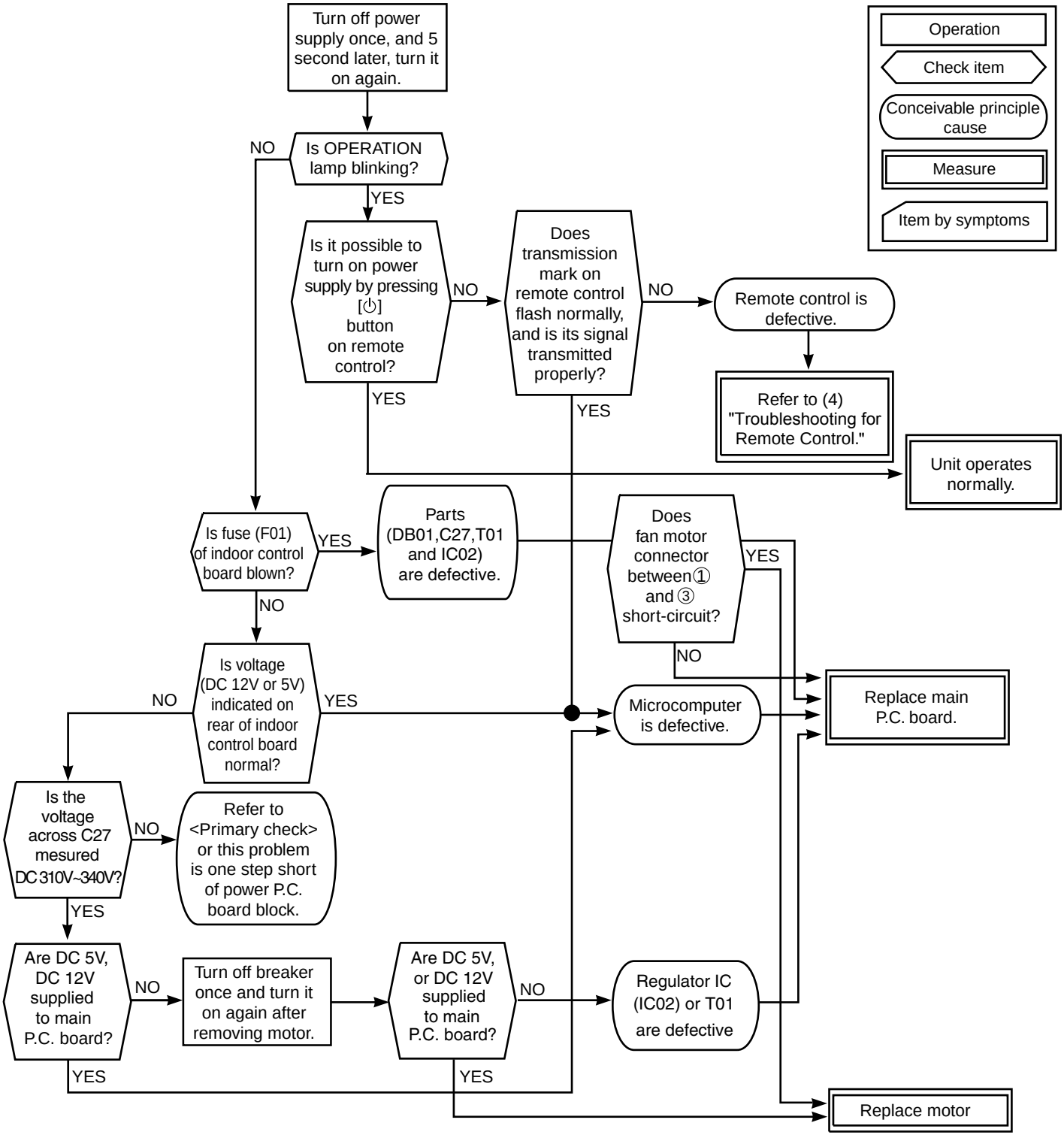
10-5. Judgment of Trouble by Every Symptom

10-5-1. Indoor Unit (Including Remote Controller)

(1) Power is not turned on (Does not operate entirely)

<Primary check>

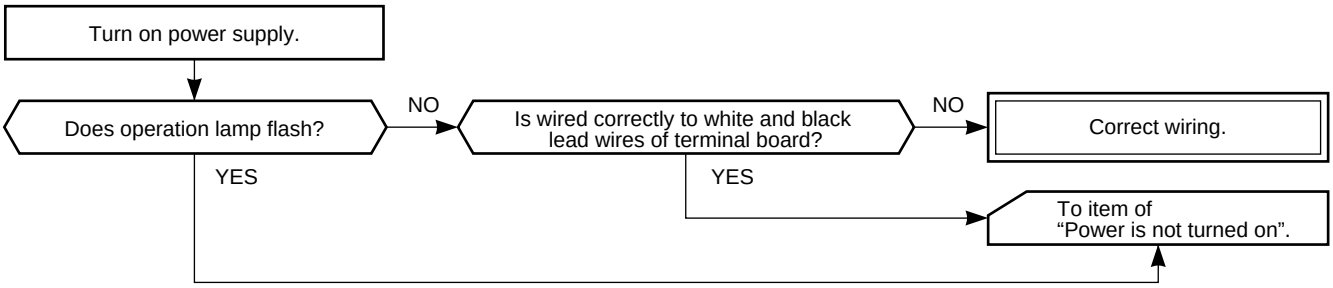
1. Is the supply voltage normal?
2. Is the normal voltage provided to the outdoor unit?
3. Is the crossover cable connected properly?
4. Is the fuse (F01) blown?


Operation
Check item
Conceivable principle cause
Measure
Item by symptoms
Turn off power supply once, and 5 second later, turn it on again.
Is OPERATION lamp blinking?
NO
YES
Is it possible to turn on power supply by pressing [⏻] button on remote control?
NO
Does transmission mark on remote control flash normally, and is its signal transmitted properly?
NO
Remote control is defective.
Refer to (4) "Troubleshooting for Remote Control."
YES
YES
Unit operates normally.
Is fuse (F01) of indoor control board blown?
YES
Parts (DB01,C27,T01 and IC02) are defective.
NO
Does fan motor connector between① and ③ short-circuit?
YES
NO
Is voltage (DC 12V or 5V) indicated on rear of indoor control board normal?
NO
YES
Microcomputer is defective.
Replace main P.C. board.
Is the voltage across C27 mesured DC 310V~340V?
NO
Refer to <Primary check> or this problem is one step short of power P.C. board block.
YES
Are DC 5V, DC 12V supplied to main P.C. board?
NO
Turn off breaker once and turn it on again after removing motor.
Are DC 5V, or DC 12V supplied to main P.C. board?
NO
Regulator IC (IC02) or T01 are defective
YES
YES
Replace motor

- Be sure to disconnect the motor connector CN31 after shut off the power supply, or it will be a cause of damage of the motor.

(2) Power is not turned on though Indoor P.C. board is replaced

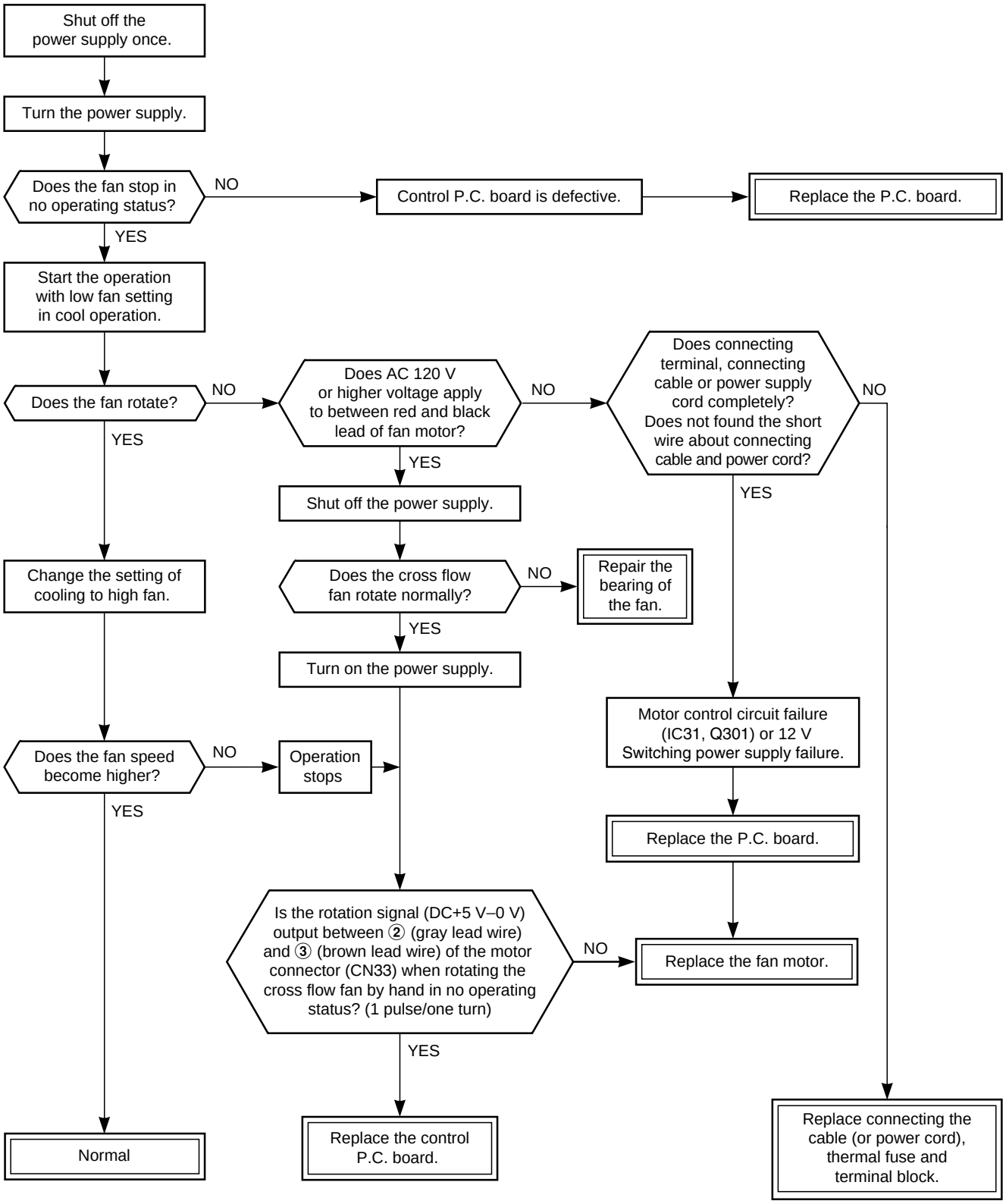
<Confirmation procedure>



(3) Only the indoor motor fan does not operate

<Primary check>

1. Is it possible to detect the power supply voltage (AC220–240V) between ① and ② on the terminal block?
2. Does the indoor fan motor operate in cooling operation?
   (In heating operation, the indoor fan motor does not operate for approximately 10 minutes after it is turned on, to prevent a cold air from blowing in.)


Shut off the power supply once.
Turn the power supply.
Does the fan stop in no operating status?
NO
Control P.C. board is defective.
Replace the P.C. board.
YES
Start the operation with low fan setting in cool operation.
Does the fan rotate?
NO
Does AC 120 V or higher voltage apply to between red and black lead of fan motor?
NO
Does connecting terminal, connecting cable or power supply cord completely? Does not found the short wire about connecting cable and power cord?
NO
YES
YES
YES
Shut off the power supply.
Change the setting of cooling to high fan.
Does the cross flow fan rotate normally?
NO
Repair the bearing of the fan.
YES
Turn on the power supply.
Motor control circuit failure (IC31, Q301) or 12 V Switching power supply failure.
Does the fan speed become higher?
NO
Operation stops
YES
Replace the P.C. board.
Is the rotation signal (DC+5 V–0 V) output between ② (gray lead wire) and ③ (brown lead wire) of the motor connector (CN33) when rotating the cross flow fan by hand in no operating status? (1 pulse/one turn)
NO
Replace the fan motor.
YES
Normal
Replace the control P.C. board.
Replace connecting the cable (or power cord), thermal fuse and terminal block.

(For AC fan motor)

<Inspection procedure>

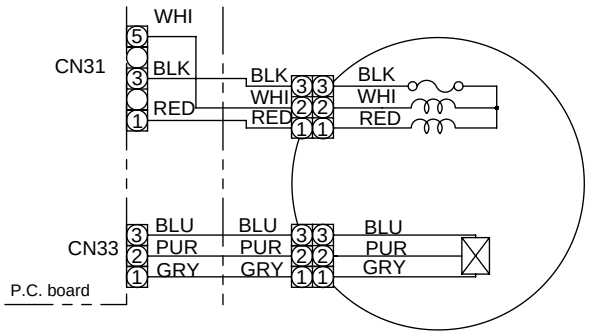
1. Remove the front panel. (Remove 2 screws.)
2. Remove the cover of the fan motor lead wires.
3. Check AC voltage with CN31 connector while the fan motor is rotating.

NOTE :

- Using a tester, measure the resistance value of each winding coil.
- Use a thin test rod.

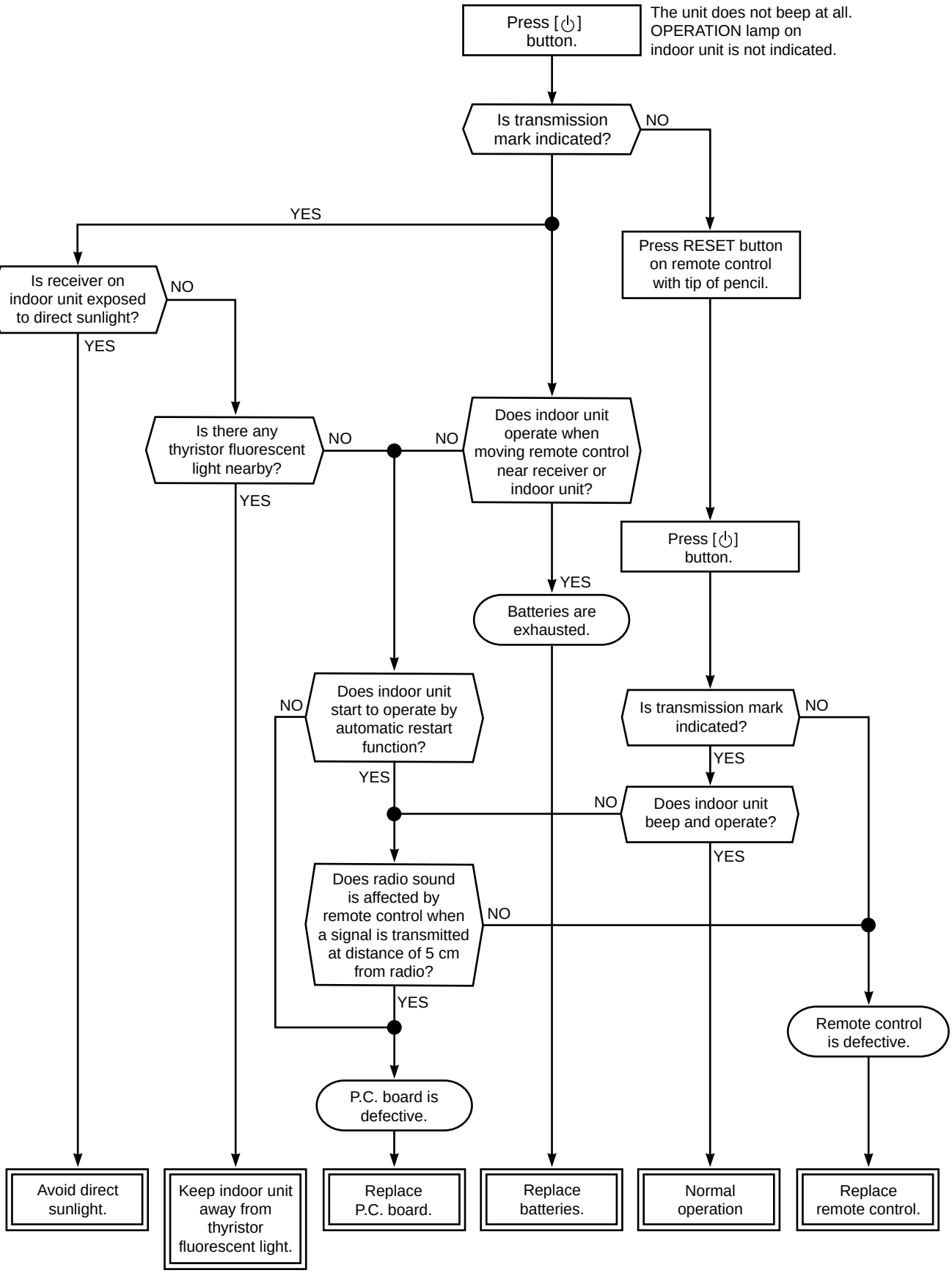
AFN-220-20-4D

- Do not disconnect the connector while the fan motor is rotating.
- For P.C. board side, proceed to the item "Only indoor fan does not operate" of "Judgment of Trouble by Every Symptom".



Position (P.C. board)	Resistance value
Between ③ (Black) - ① (Red)	249 ± 17 Ω
Between ③ (Black) - ⑤ (White)	373 ± 26 Ω
Between ① (Red) - ⑤ (White)	622 ± 44 Ω

(4) Troubleshooting for remote control


Press [⏻] button.
The unit does not beep at all. OPERATION lamp on indoor unit is not indicated.
Is transmission mark indicated?
NO
YES
Press RESET button on remote control with tip of pencil.
Is receiver on indoor unit exposed to direct sunlight?
NO
YES
Is there any thyristor fluorescent light nearby?
NO
YES
NO
Does indoor unit operate when moving remote control near receiver or indoor unit?
Press [⏻] button.
YES
Batteries are exhausted.
NO
Does indoor unit start to operate by automatic restart function?
YES
Is transmission mark indicated?
NO
YES
NO
Does indoor unit beep and operate?
YES
Does radio sound is affected by remote control when a signal is transmitted at distance of 5 cm from radio?
NO
YES
Remote control is defective.
P.C. board is defective.
Avoid direct sunlight.
Keep indoor unit away from thyristor fluorescent light.
Replace P.C. board.
Replace batteries.
Normal operation
Replace remote control.

10-5-2. Wiring Failure (Interconnecting and Serial Signal Wire)

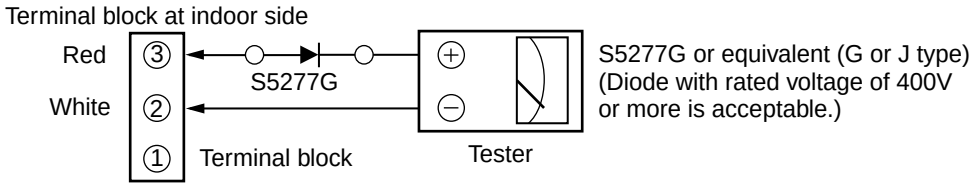
(1) Outdoor unit does not operate

1) Is the voltage between ② and ③ of the indoor terminal block varied?

Confirm that transmission from indoor unit to outdoor unit is correctly performed based upon the following diagram.

NOTE:

- Measurement should be performed 2 minutes and 30 seconds after starting of the operation.
- Be sure to prepare a diode for judgment.

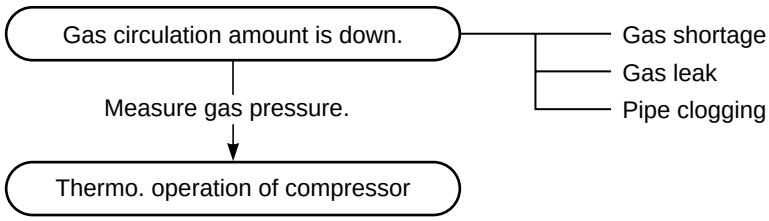


Normal time : Voltage swings between DC15 and 60V. ..... Inverter Assembly check (**10-7-1.**)
Abnormal time : Voltage does not vary.

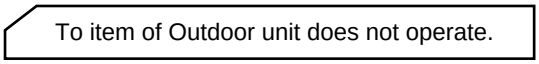
(2) Outdoor unit stops in a little while after operation started

<Check procedure> Select phenomena described below.

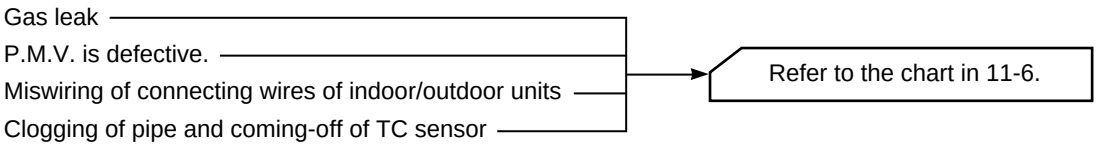
1) The outdoor unit stops 10 to 20 minutes after operation started, and 10 minutes or more are required to restart the unit.



2) If the unit stops once, it does not operate until the power will be turned on again.

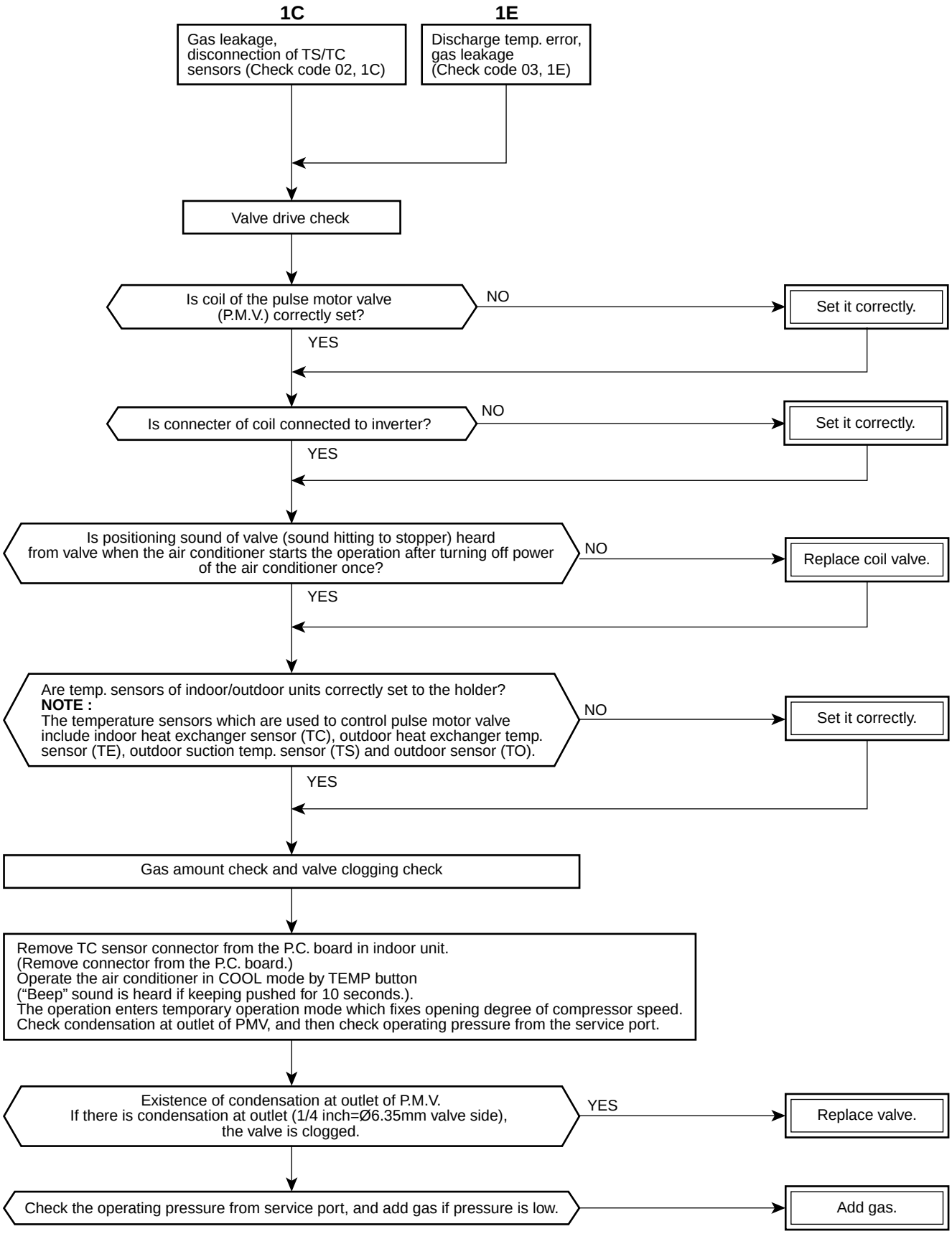


3) The outdoor unit stops 10 minutes to 1 hour after operation started, and an alarm is displayed. (Discharge temp. error check code 03, 1E Sensor temp. error check code 02, 1C)


Gas leak
P.M.V. is defective.
Miswiring of connecting wires of indoor/outdoor units
Clogging of pipe and coming-off of TC sensor
Refer to the chart in 11-6.

10-6. How to Check Simple the Main Parts

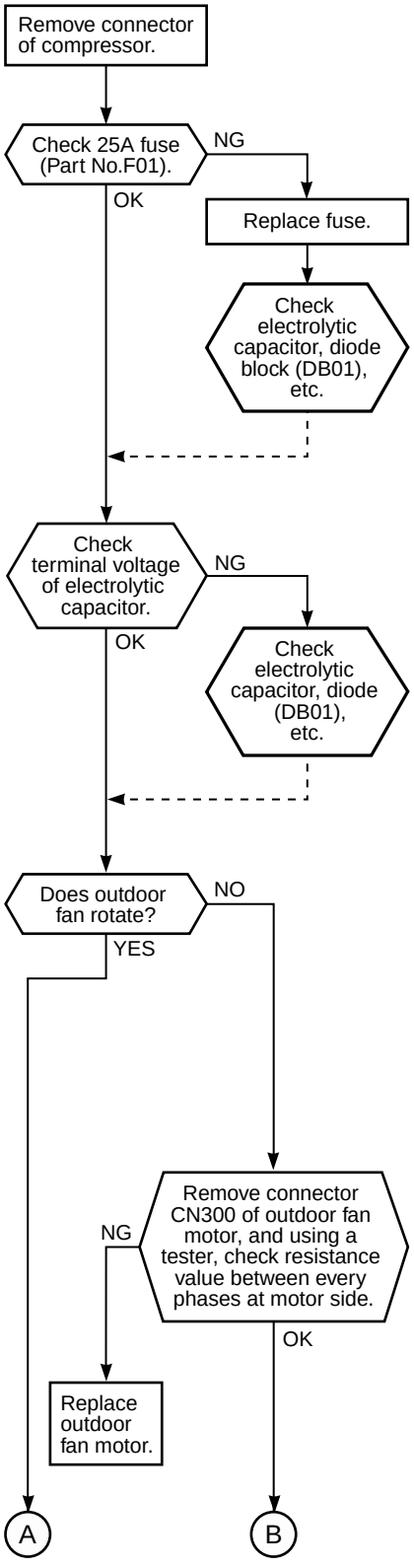
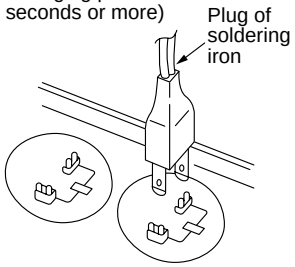
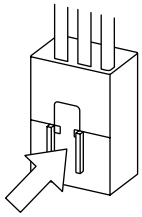
<Check procedure>

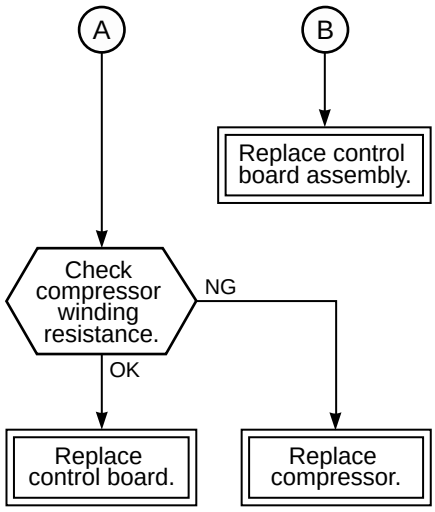

1C
Gas leakage, disconnection of TS/TC sensors (Check code 02, 1C)
1E
Discharge temp. error, gas leakage (Check code 03, 1E)
Valve drive check
Is coil of the pulse motor valve (P.M.V.) correctly set?
NO
Set it correctly.
YES
Is connecter of coil connected to inverter?
NO
Set it correctly.
YES
Is positioning sound of valve (sound hitting to stopper) heard from valve when the air conditioner starts the operation after turning off power of the air conditioner once?
NO
Replace coil valve.
YES
Are temp. sensors of indoor/outdoor units correctly set to the holder?
NOTE :
The temperature sensors which are used to control pulse motor valve include indoor heat exchanger sensor (TC), outdoor heat exchanger temp. sensor (TE), outdoor suction temp. sensor (TS) and outdoor sensor (TO).
NO
Set it correctly.
YES
Gas amount check and valve clogging check
Remove TC sensor connector from the P.C. board in indoor unit.
(Remove connector from the P.C. board.)
Operate the air conditioner in COOL mode by TEMP button
("Beep" sound is heard if keeping pushed for 10 seconds.).
The operation enters temporary operation mode which fixes opening degree of compressor speed.
Check condensation at outlet of PMV, and then check operating pressure from the service port.
Existence of condensation at outlet of P.M.V.
If there is condensation at outlet (1/4 inch=Ø6.35mm valve side), the valve is clogged.
YES
Replace valve.
Check the operating pressure from service port, and add gas if pressure is low.
Add gas.

10-7. How to Diagnose Trouble in Outdoor Unit

10-7-1. Summarized Inner Diagnosis of Inverter Assembly

Table 10-7-1

Diagnosis/Process flowchart	Item	Contents	Summary
	Preparation	Turn "OFF" the power supply breaker, and remove 3P connector which connects inverter and compressor.	
	Check	• Check whether 25A fuse on the control board assembly is blown or not. (F01)	If fuse was blown, be sure to check the electrolytic capacitor and diode block. (DB01)
	Check		• Connect discharge resistance (approx. 100Ω, 40W) or soldering iron (plug) between +, – terminals of the electrolytic capacitor (500µF or 760µF) of C14 (with printed CAUTION HIGH VOLTAGE) on P.C. board. Discharging position (Discharging period 10 seconds or more) Plug of soldering iron 
	Operation	Turn on the power breaker, and operate the air conditioner in COOL mode by time shortening.	OK if 500µF or 760µF → DC280 to 380V
	Measurement	Measure terminal voltage of the electrolytic capacity. 500µF:400WV x 3 760µF:400WV x 3	Remove CN300 while pushing the part indicated by an arrow because CN300 is a connector with lock. 
	Check Stop	After operation, turn off the power breaker after 2 minutes 20 seconds passed, and discharge the electrolytic capacitor by soldering iron. Check voltage between motor phases.	
	Check Measurement	• Is not winding between ①-②, ②-③, or ①-③ opened or short-circuited?	→ Resistance between phases should be approx. 55 to 77Ω
		• Is not frame grounded with ①, ②, or ③?	→ Should be 10MΩ or more.

Diagnosis/Process flowchart	Item	Contents	Summary
	Check	Check winding resistance between phases of compressor, and resistance between outdoor frames by using a tester. • Is not grounded. • Is not short-circuited between windings. • Winding is not opened.	→ OK if 10MΩ or more → OK if 0.51Ω → 0.57Ω (Check by a digital tester.)
	Operation	Remove connector CN300 of the outdoor fan motor, turn on the power supply breaker, and perform the operation. (Stops though activation is prompted.) Check operation within 2 minutes 20 seconds after activation stopped.	

10-8. How to Check Simply the Main Parts

10-8-1. How to Check the P.C. Board (Indoor Unit)

(1) Operating precautions

1) When removing the front panel or the P.C. board, be sure to shut off the power supply breaker.
2) When removing the P.C. board, hold the edge of the P.C. board and do not apply force to the parts.
3) When connecting or disconnecting the connectors on the P.C. board, hold the whole housing. Do not pull at the lead wire.

(2) Inspection procedures

1) When a P.C. board is judged to be defective, check for disconnection, burning, or discoloration of the copper foil pattern or this P.C. board.
2) The P.C. board consists of the following 2 parts

a. Main P.C. board part :

DC power supply circuit, Indoor fan motor control circuit, CPU and peripheral circuits, buzzer, and Driving circuit of louver.

b. Indication unit of infrared ray receiving infrared ray receiving circuit, LED :

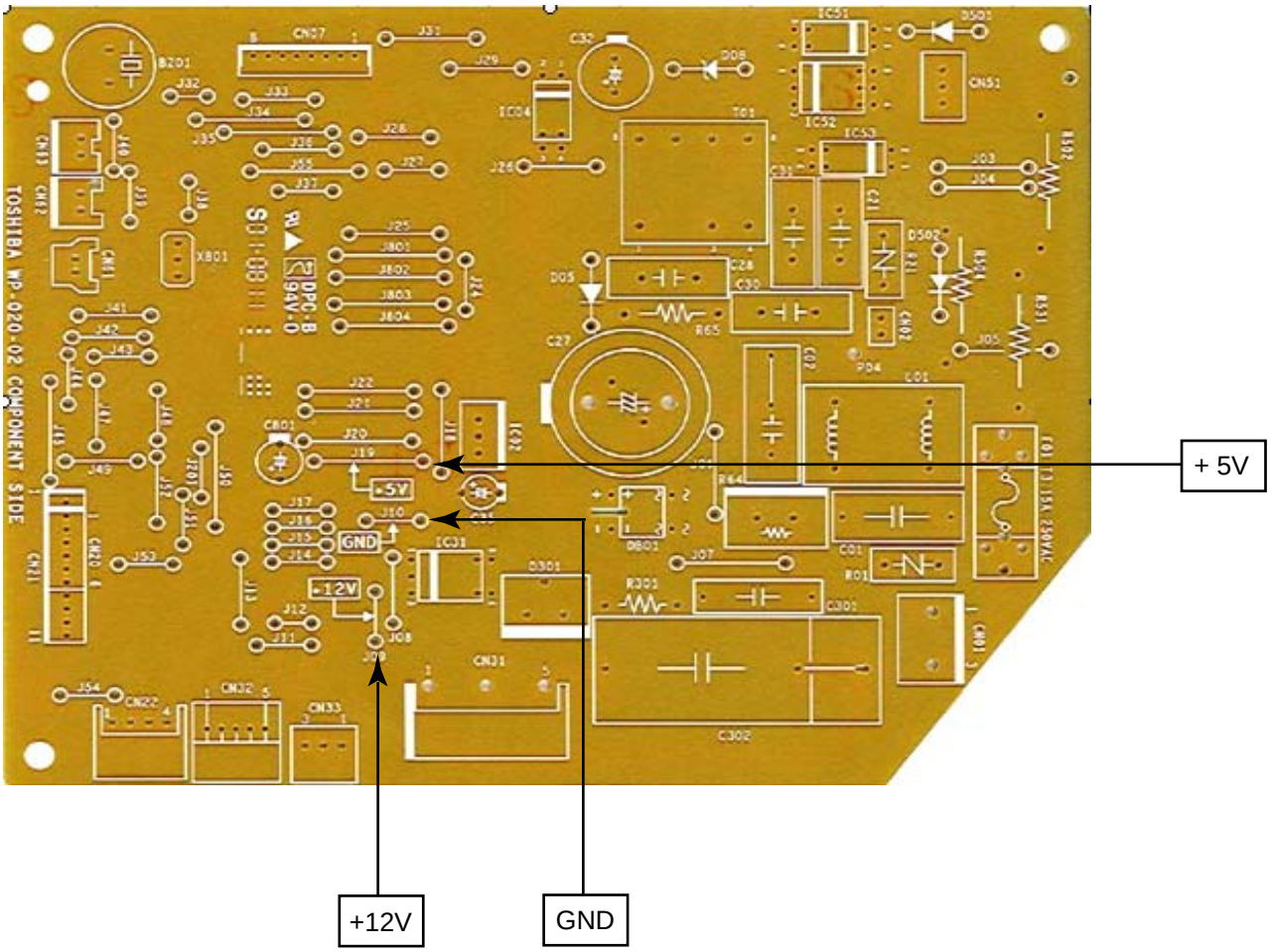
To check defect of the P.C. board, follow the procedure described below.

(3) Check procedures

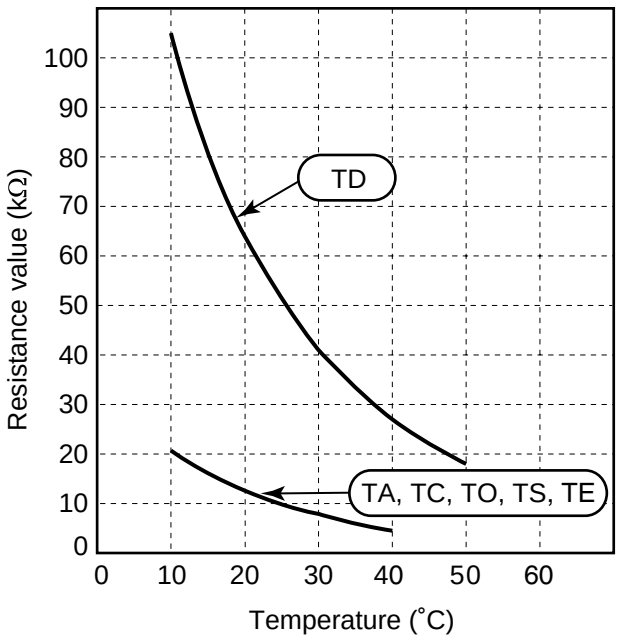
Table 10-8-1

No.	Procedure	Check points	Causes
1	Turn off the power supply breaker and remove the P.C. board assembly from electronic parts base. Remove the connecting cables from the terminal block.	Check whether or not the fuse (F01) is blown.	Impulse voltage was applied or the indoor fan motor short-circuited.
2	Remove the connector of the motor and turn on the power supply breaker. If OPERATION indicator flashes (once per second), it is not necessary to check steps (1 to 3) in the right next column.	Check power supply voltage : 1. Between No. 1 and No. 3 of CN01 (AC 220–240V) 2. Between ⊕ and ⊖ of C27 (DC 310–340V) 3. Between 12V and GND 4. Between 5V and GND	1. The terminal block or the crossover cable is connected wrongly. 2. The capacitor (C01), line filter (L01), resistor (R64), or the diode (DB01) is defective. 3. T01 is defective. 4. IC02 and T01 are defective.
3	Push [⏻] button once to start the unit. (Do not set the mode to On-Timer operation.)	Check power supply voltage : 1. Between CN51 and No. 1 of CN01 (DC 15–60V)	IC51 and IC52 are defective.
4	Shorten the restart delay timer and start unit.	Check whether or not all indicators (OPERATION,TIMER,FILTER,PRE.DEF, Hi POWER) are lit for 3 seconds and they return to normal 3 seconds later.	The indicators are defective or the housing assembly (CN21) is defective.
5	Push [⏻] button once to start the unit. • Shorten the restart delay timer. • Set the operation mode to COOL. • Set the fan speed level to AUTO. • Set the preset temperature much lower than the room temperature. (The unit (compressor) operates continuously in the above condition.)	1. Check whether or not the compressor operates. 2. Check whether or not the OPERATION indicator flashes.	1. The temperature of the indoor heat exchanger is extremely low. 2. The connection of the heat exchanger sensor is loose. (The connector is disconnected.) (CN62) 3. The heat exchanger sensor and the P.C. board are defective. (Refer to Table 10-4-1.) 4. The main P.C. board is defective.
6	If the above condition (No. 5) still continues, start the unit in the following condition. • Set the operation mode to HEAT. • Set the preset temperature much higher than room temperature.	1. Check whether or not the compressor operates. 2. Check whether or not the OPERATION indicator flashes.	1. The temperature of the indoor heat exchanger is extremely high. 2. The connection of the heat exchanger sensor short-circuited. (CN62) 3. The heat exchanger sensor and the P.C. board are defective. (Refer to Table 10-4-1.) 4. The main P.C. board is defective
7	Connect the motor connector to the motor and turn on the power supply. Start the unit the following condition. • Set the fan speed level to HIGH. (The unit (compressor) operates continuously in the above condition in No. 5.)	1. Check it is impossible to detect the voltage (AC120V or higher voltage) between red and black lead of the motor. 2. The motor does not operate or the fan motor does not rotate with high speed. (But it is possible to receive the signal from the remote controller.) 3. The motor rotates but vibrates strongly.	1. The indoor fan motor is defective. (Protected operation of P.C. board.) 2. The P.C. board is defective. 3. The connection of the motor connector is loose.

10-8-2. P .C . Board Layout

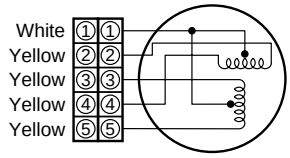


[1] Sensor characteristic table



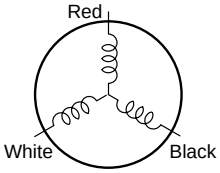
TD : Discharge temp. sensor
TA : Room temp. sensor
TC : Heat exchanger temp. sensor
TO : Outdoor temp. sensor
TS : Suction temp. sensor
TE : Outdoor heat exchanger temp sensor

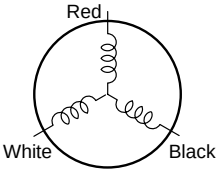
10-8-3. Indoor Unit (Other Parts)

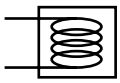
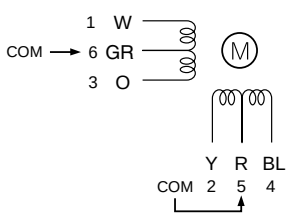
<table>
<tr><th>No.</th><th>Part name</th><th>Checking procedure</th></tr>
<tr><td>1</td><td>Room temp. (TA) sensor
Heat exchanger (TC) sensor</td><td>Disconnect the connector and measure the resistance value with tester.
(Normal temp.)
<table>
<tr><th>Sensor \ Temperature</th><th>10°C</th><th>20°C</th><th>25°C</th><th>30°C</th><th>40°C</th></tr>
<tr><td>TA, TC (kΩ)</td><td>20.7</td><td>12.6</td><td>10.0</td><td>7.9</td><td>4.5</td></tr>
</table></td></tr>
<tr><td>2</td><td>Remote controller</td><td>Refer to 11-5-1. (5).</td></tr>
<tr><td>3</td><td>Louver motor
MSBPC20F04</td><td>Measure the resistance value of each winding coil by using the tester.
(Under normal temp. 25°C)
 

<table>
<tr><th>Position</th><th>Resistance value</th></tr>
<tr><td>1 to 2
1 to 3
1 to 4
1 to 5</td><td>250Ω ± 7%</td></tr>
</table></td></tr>
<tr><td>4</td><td>Indoor fan motor</td><td>Refer to 11-5-1. (3) and (4).</td></tr>
</table>

10-8-4. OutdoorUnit

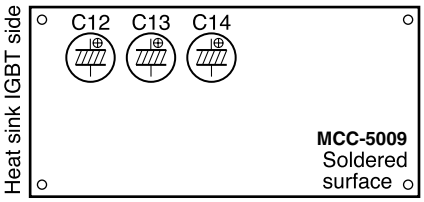
<table>
<tr><th>No.</th><th>Part name</th><th>Checking procedure</th></tr>
<tr><td>1</td><td>Compressor
(Model : DA89X1C-23FZ2)</td><td>Measure the resistance value of each winding by using the tester.
 

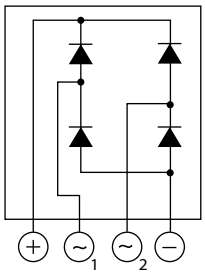
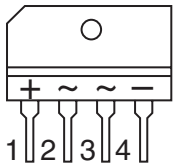
<table>
<tr><th rowspan="2">Position</th><th>Resistance value</th></tr>
<tr><td>DA89X1C-1F-23FZ2</td></tr>
<tr><td>Red - White</td><td rowspan="3">1.04 to 1.16Ω</td></tr>
<tr><td>White - Black</td></tr>
<tr><td>Black - Red</td></tr>
</table>
Under 20ºC</td></tr>
<tr><td>2</td><td>Outdoor fan motor
(Model : ICF-140-43-4R)</td><td>Measure the resistance value of winding by using the tester.
 

<table>
<tr><th>Position</th><th>Resistance value</th></tr>
<tr><td>Red - White</td><td>20 to 22Ω</td></tr>
<tr><td>White - Black</td><td>20 to 22Ω</td></tr>
<tr><td>Black- Red</td><td>20 to 22Ω</td></tr>
</table></td></tr>
<tr><td>3</td><td>4-way valve coil
(Model : STF-01AJ646A1)</td><td>Measure the resistance value of winding by using the tester.
 
<table>
<tr><th>Resistance value</th></tr>
<tr><td>1435 ± 144Ω</td></tr>
</table>
Under 20°C</td></tr>
<tr><td>4</td><td>Pulse motor valve coil
(Model : CAM-MD12TCTH-5)</td><td>Measure the resistance value of winding by using the tester.
 

<table>
<tr><th>Position</th><th>Resistance value</th></tr>
<tr><td>Gray - White</td><td>43 to 49Ω</td></tr>
<tr><td>Gray - Orange</td><td>43 to 49Ω</td></tr>
<tr><td>Red- Yellow</td><td>43 to 49Ω</td></tr>
<tr><td>Red- Blue</td><td>43 to 49Ω</td></tr>
</table>
Under 20°C</td></tr>
<tr><td>5</td><td>Outdoor temperature sensor (TO), discharge temperature sensor (TD), suction temperature sensor (TS), outdoor heat exchanger temperature sensor (TE)</td><td>Disconnect the connector, and measure resistance value with the tester.
(Normal temperature)
<table>
<tr><th>Sensor \ Temperature</th><th>10°C</th><th>20°C</th><th>25°C</th><th>30°C</th><th>40°C</th><th>50°C</th></tr>
<tr><td>TD (kΩ)</td><td>100</td><td>64</td><td>50</td><td>41</td><td>27</td><td>18</td></tr>
<tr><td>TO,TS,TE (kΩ)</td><td>20.7</td><td>12.6</td><td>10.0</td><td>7.9</td><td>4.5</td><td>—</td></tr>
</table></td></tr>
</table>

10-8-5. Checking Method for Each Part

<table>
<tr><th>No.</th><th>Part name</th><th>Checking procedure</th></tr>
<tr><td>1</td><td>Electrolytic capacitor
(For raising pressure, smoothing)</td><td>1. Turn OFF the power supply breaker.
2. Discharge all three capacitors completely.
3. Check that safety valve at the bottom of capacitor is not broken.
4. Check that vessel is not swollen or exploded.
5. Check that electrolytic liquid does not blow off.
6. Check that the normal charging characteristics are show in continuity test by the tester.
 

<table><tr><th>Case that product is good</th></tr><tr><td>Pointer swings once, and returns slowly. When performing test once again under another polarity, the pointer should return.</td></tr></table>
C12, C13, C14 → 500μF/400V</td></tr>
<tr><td>2</td><td>Converter module</td><td>1. Turn OFF the power supply breaker.
2. Discharge all three capacitors completely.
3 Check that the normal rectification characteristics are shown in continuity test by the tester.
 


(DB01)
Diode check
<table>
<tr><th colspan="2">Tester rod</th><th>Resistance value in good product</th></tr>
<tr><td>⊕</td><td>⊖</td><td rowspan="5">50kΩ or more
(0Ω in trouble)</td></tr>
<tr><td>~1</td><td rowspan="2">⊖</td></tr>
<tr><td>~2</td></tr>
<tr><td rowspan="2">⊕</td><td>~1</td></tr>
<tr><td>~2</td></tr>
</table></td></tr>
</table>

10-9. How to Simply Judge Whether Outdoor Fan Motor is Good or Bad

1. Symptom

- Outdoor fan motor does not rotate.
- Outdoor fan motor stops within several tens seconds though it started rotating.
- Outdoor fan motor rotates or does not rotate according to the position where the fan stopped, etc.

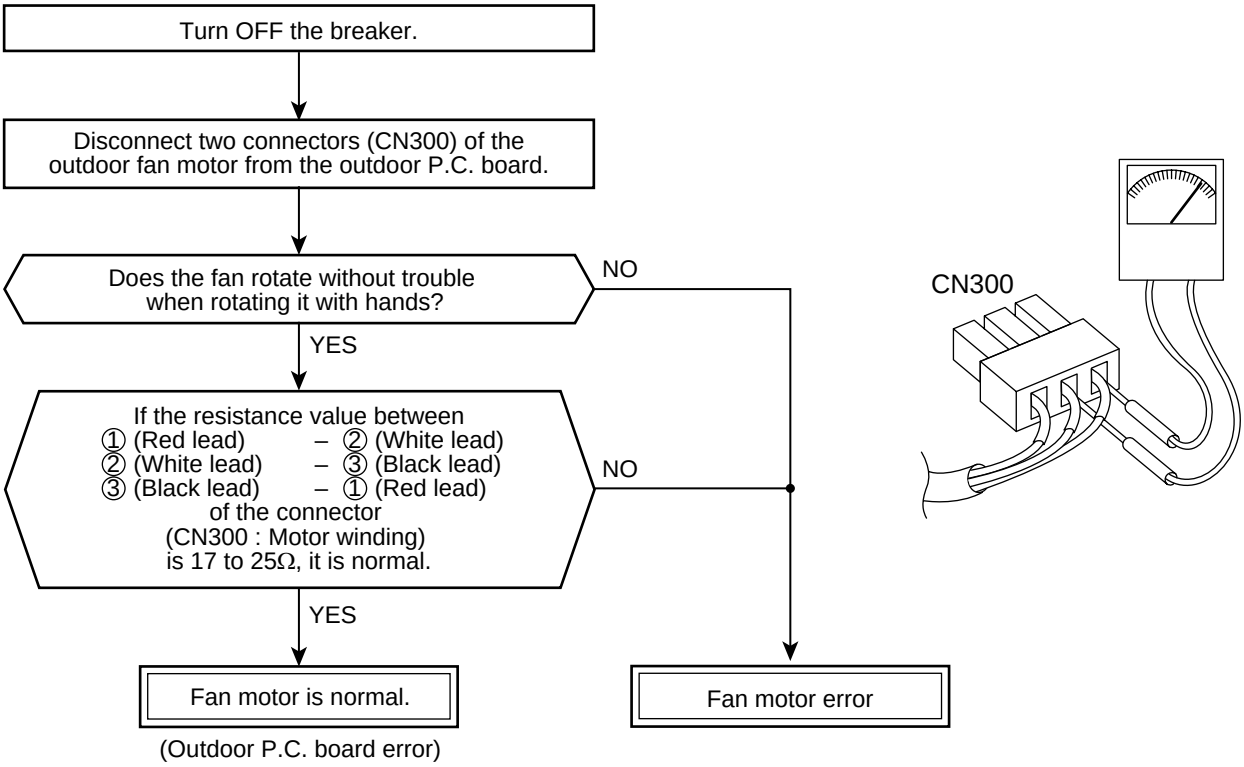
Remote controller check code “02 : Outdoor block, 1A : Outdoor fan drive system error”

2. Cause

The following causes are considered when the outdoor fan motor does not normally rotate.

1) Mechanical lock of the outdoor fan motor
2) Winding failure of the outdoor fan motor
3) Position-detect circuit failure inside of the outdoor fan motor
4) Motor drive circuit failure of the outdoor P.C. board

3. How to simply judge whether outdoor fan motor is good or bad


Turn OFF the breaker.
Disconnect two connectors (CN300) of the outdoor fan motor from the outdoor P.C. board.
Does the fan rotate without trouble when rotating it with hands?
NO
YES
If the resistance value between
① (Red lead) – ② (White lead)
② (White lead) – ③ (Black lead)
③ (Black lead) – ① (Red lead)
of the connector
(CN300 : Motor winding)
is 17 to 25Ω, it is normal.
NO
YES
Fan motor is normal.
(Outdoor P.C. board error)
Fan motor error
CN300

NOTE :

However, GND circuit error inside of the motor may be accepted in some cases when the above check is performed.

When the fan motor does not become normal even if P.C. board is replaced, replace the outdoor fan motor.

11. HOW TO REPLACE THE MAIN PARTS

WARNING

- Since high voltages pass through the electrical parts, turn off the power without fail before proceeding with the repairs.

  Electric shocks may occur if the power plug is not disconnected.
- After the repairs have been completed (after the front panel and cabinet have been installed), perform a test run, and check for smoking, unusual sounds and other abnormalities.

  If this check is omitted, a fire and/or electric shocks may occur.
  Before proceeding with the test run, install the front panel and cabinet.
- Ensure that the following steps are taken when doing repairs on the refrigerating cycle.
  1. Do not allow any naked flames in the surrounding area.
     If a gas stove or other appliance is being used, extinguish the flames before proceeding.

     If the flames are not extinguished, they may ignite any oil mixed with the refrigerant gas.
  2. Do not use welding equipment in an airtight room.

     Carbon monoxide poisoning may result if the room is not properly ventilated.
  3. Do not bring welding equipment near flammable objects.

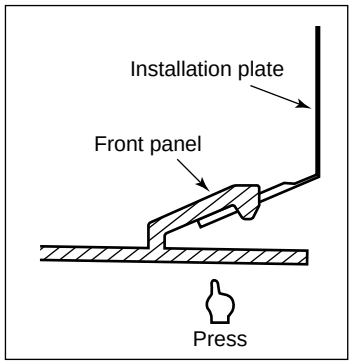
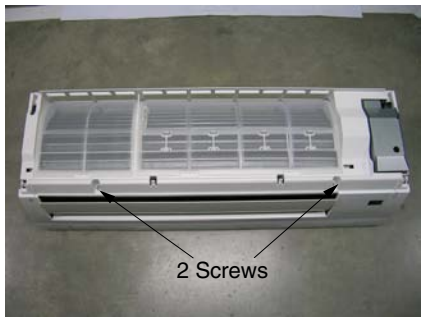
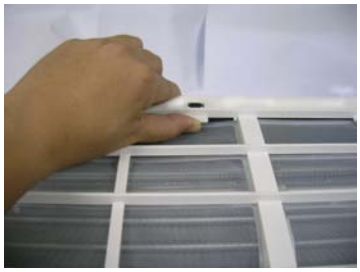
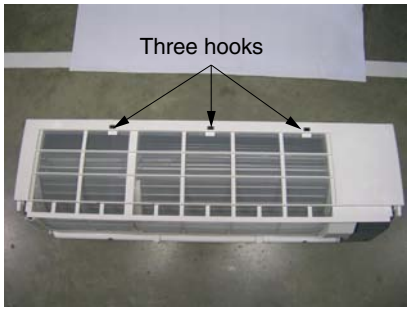
     Flames from the equipment may cause the flammable objects to catch fire.
- **If keeping the power on is absolutely unavoidable while doing a job such as inspecting the circuitry, wear rubber gloves to avoid contact with the live parts.**

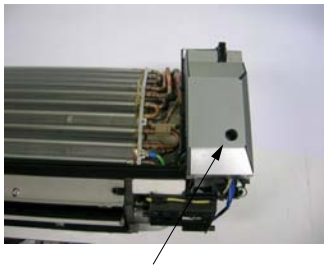
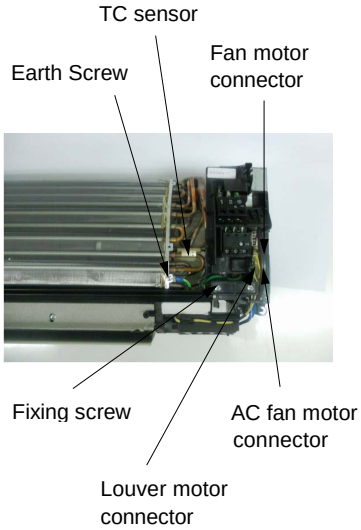
  Electric shocks may be received if the live parts are touched.
  High-voltage circuits are contained inside this unit.

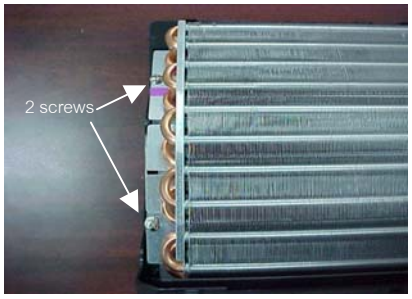
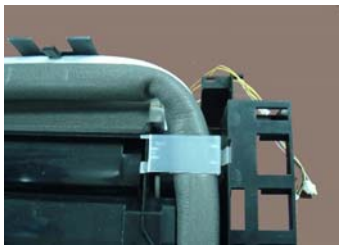
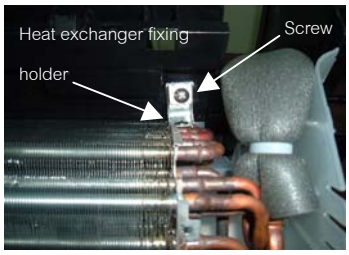
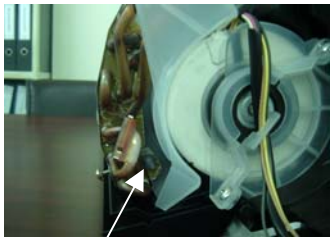
  Proceed very carefully when conducting checks since directly touching the parts on the control circuit board may result in electric shocks.

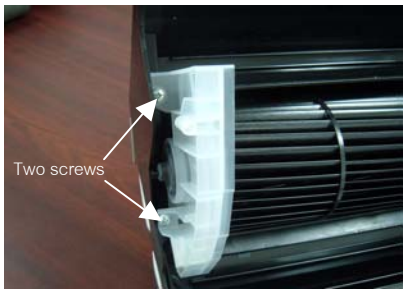
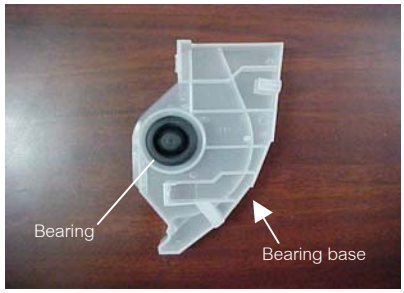
11-1. Indoor Unit

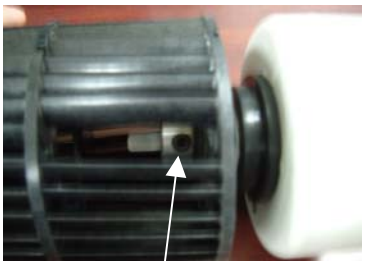
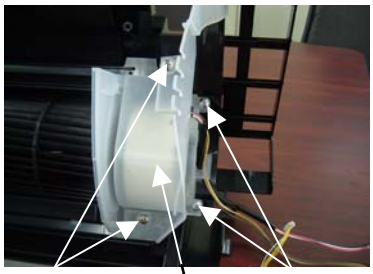
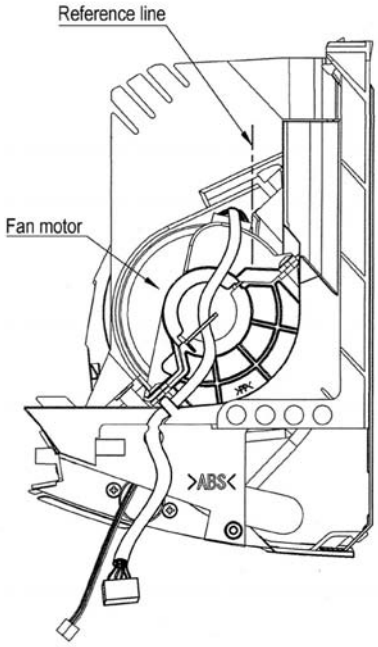
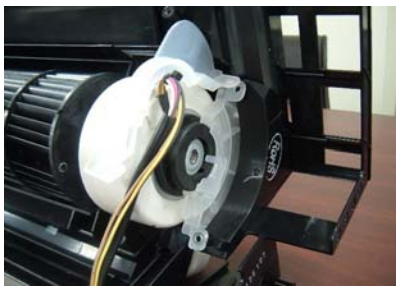
No.	Part name	Procedures	Remarks
①	Front panel	1) Stop operation of the air conditioner and turn off its main power supply. 2) Open the air inlet grille, push the arm toward the outside, and remove the grille. 3) Remove the left and right air filters.	

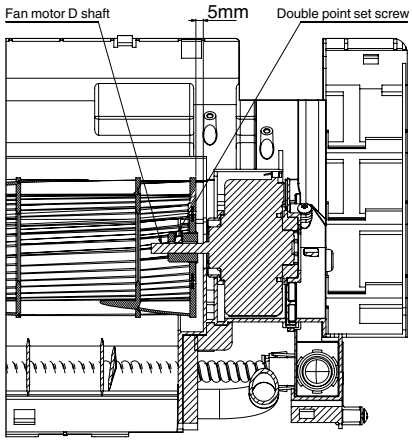
No.	Part name	Procedures	Remarks
①	Front panel	4) Press "PUSH" part under the front panel and remove hooks of the front panel from the installation plate.	
		5) Remove the front panel fixing screws. (2 pcs.) 6) Take off three hooks of panel from rear side.	
			
		<How to assemble the front panel> 1) Press three center positions and two lower center positions of the air outlet, and then hang the hanging hooks (3 pcs.) at the top side of the front panel to the rear plate. 2) Tighten two screws. • Incomplete hanging or incomplete pressing may cause a dewdrops or generation of a fluttering sound.	

No.	Part name	Procedures	Remarks
②	Electric parts box assembly	1) Follow the procedure up to 3) in ② above. 2) Remove screw of earth lead attached to the end plate of the evaporator. 3) Remove the lead wire cover, and remove connector for the fan motor and connector for the louver motor from the electric parts box assembly. 4) Pull out TC sensor from sensor holder of the evaporator. 5) Disengage the display unit by simply pushing at the top of the display unit. 6) Remove the fixing screw that secures the electric parts box assembly, and remove the assembly. **<How to assemble the electric parts box>** 1) Hook the top part of the electric parts box assembly onto the claws on the back body, Now attach the display unit. Connect the connectors for the fan motor and louver motor. 2) Secure the grounding wire using the fixing screw. Insert the TC sensor into the sensor holder. * Be absolutely sure to loop the grounding wire and TC sensor leads once at the bottom.	 Electric part box cover 

<table>
<tr><th>No.</th><th>Part name</th><th>Procedures</th><th>Remarks</th></tr>
<tr><td>③</td><td>Horizontal louver</td><td>1) Remove shaft of the horizontal louver from the back body.
(First remove the left shaft, and then remove other shafts while sliding the horizontal louver leftward.)</td><td> </td></tr>
<tr><td>④</td><td>Evaporator
(Heat exchanger)</td><td colspan="2">1) Follow to the procedure in the item ③.
2) Remove the pipe holder from the rear side of the main unit.
3) Remove two fixing screws at the left side of the end plate of the heat exchanger.
 
 
4) Remove one fixing screw on the heat exchage fixing holder to separate the heat exchage from the back body.
 
5) Remove right side of the end plate from two fixing rib while sliding slightly the heat exchanger rightward.
 
Rib on the right side of the end plate</td></tr>
</table>

No.	Part name	Procedures	Remarks
⑤	Bearing	1) Follow to the procedure in the item ④ . 2) Remove the two screws used to secure the bearing base.	
		3) Remove the bearing base. **<Caution at assembling>** • If the bearing is out from the housing, push it into the specified position and then incorporate it in the main body.	

No.	Part name	Procedures	Remarks
⑥	Fan motor	1) Follow to the procedure till item ⑤. 2) Loosen the set screw of the cross flow fan. 3) Remove two fixing screws of the motor cover and them remove the motor cover. 4) Remove two more fixing screws of the motor band and remove the motor band.	 Set screw  Two screws Two screws on motor band Motor cover
		5) Pull the fan motor outward.  Reference condition of Fan Motor's assembly.	

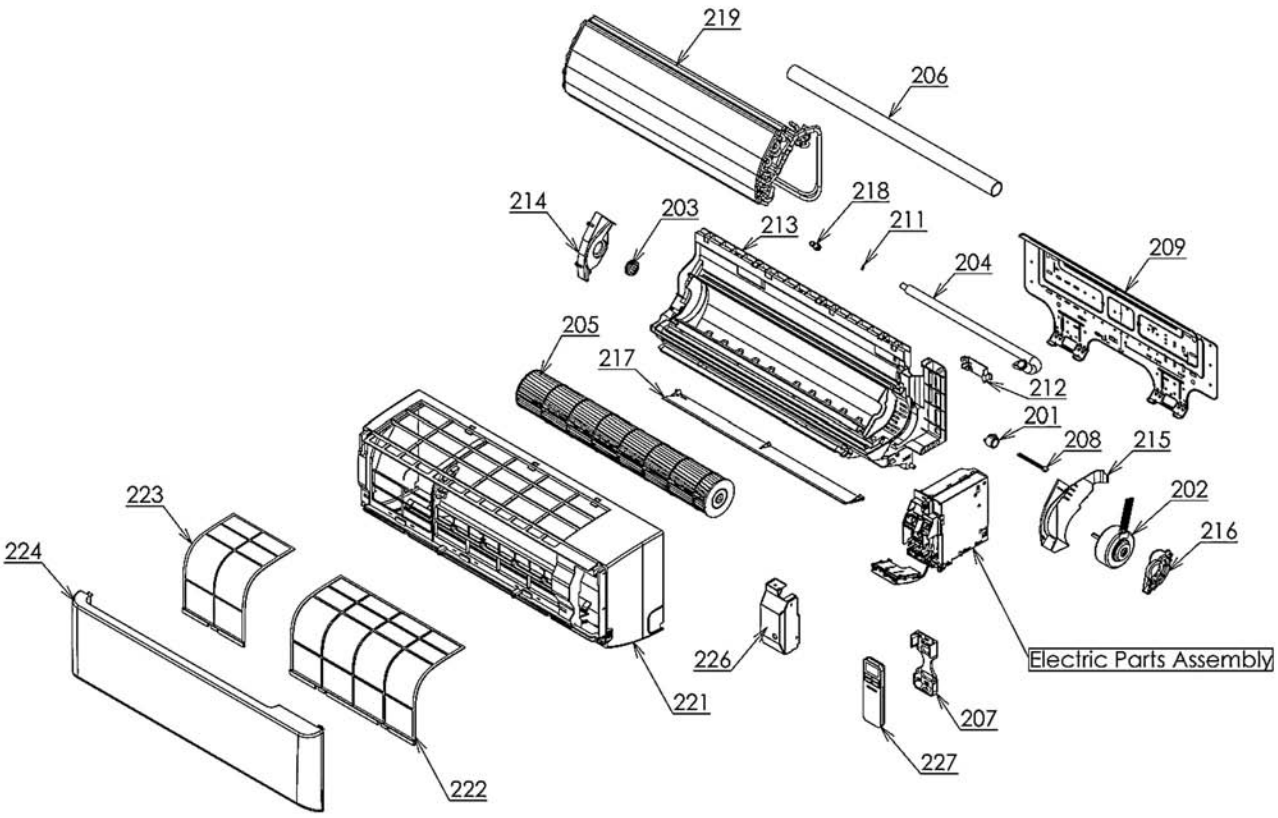
No.	Part name	Procedures	Remarks
⑦	Cross flow fan	**<Caution at reassembling>** 1) To incorporate the fan motor incorporate the motor into the position in the following figure, and then install the fan motor. • Install the cross flow fan so that the right end of the 1st joint from the right of the cross flow fan is set keeping 5.0 mm from closed wall of the main unit. • Holding the set screw, install the cross flow fan so that flat area on shaft of the fan motor comes to the mounting hole of the set screw. • Perform positioning of the fan motor as follows: • When assembling the fan motor, the fan motor must be installed in such a way that the fan motor leads will be taken out is positioned at the bottom front. • After assembling the two hooking claws of the motor band (right) into the main body, position the fan motor, insert it, and then secure the motor band (right) using the two fixing screws.	

11-2. Microcomputer

No.	Part name	Procedure	Remarks
①	Common procedure	1) Turn the power supply off to stop the operation of air-conditioner. 2) Remove the front panel. • Remove the 2 fixing screws. 3) Remove the electrical part base.	Replace terminal block, microcomputer ass'y and the P.C. board ass'y.

12. EXPLODED VIEWS AND PARTS LIST

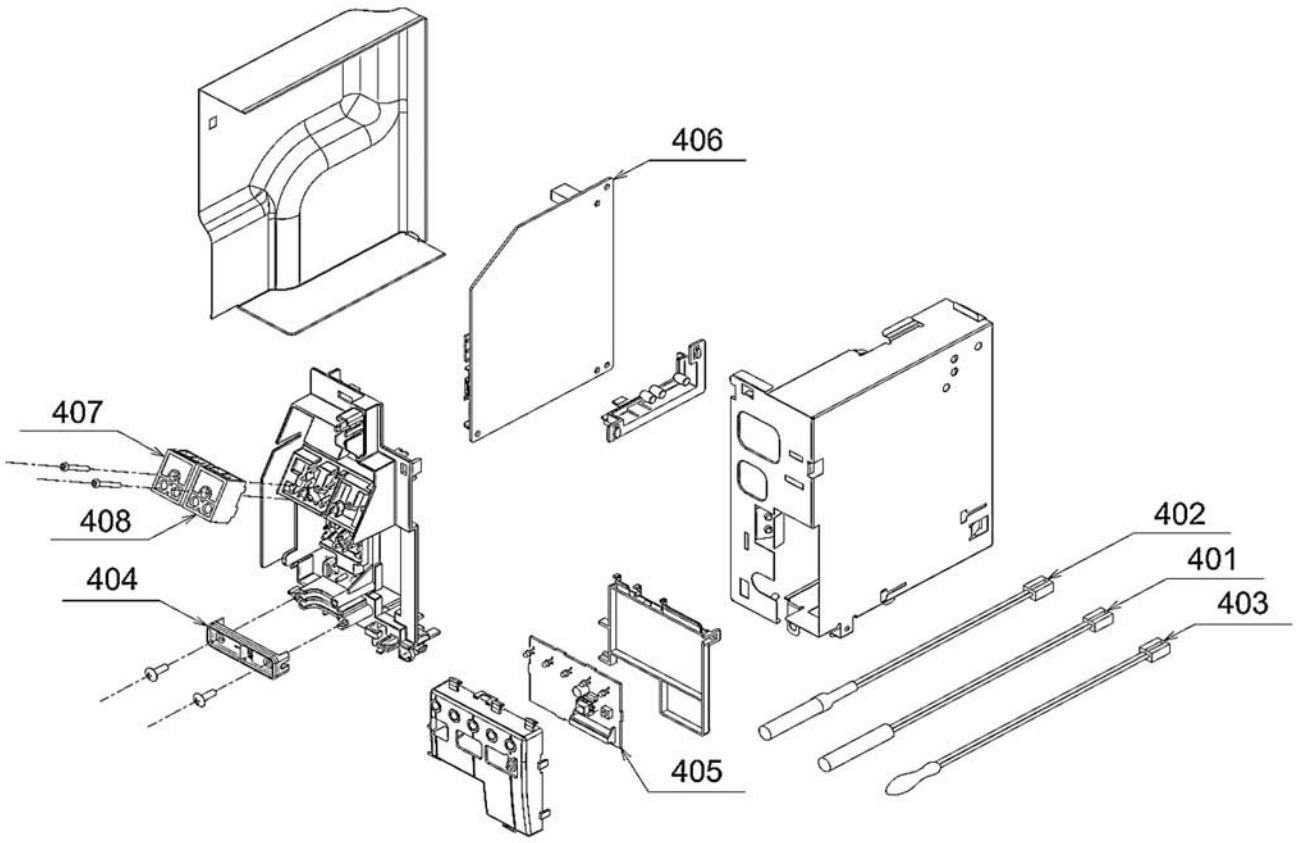
12-1. Indoor Unit (Part-E)



Location No.	Part No.	Description
201	43T21435	STEPPING MOTOR ASSEMBLY
202	43T21409	FAN MOTOR
203	43T22312	BEARING ASSY, MOLD
204	43T70313	HOSE, DRAIN
205	43T20325	CROSS FLOW FAN ASSEMBLY
206	43T11301	PIPE SHIELD
207	43T83305	HOLDER, REMOTE CONTROL
208	43T60382	MOTOR CORD
209	43T82310	INSTALLATION PLATE
211	43T19333	HOLDER, SENSOR
212	43T09408	PIPE HOLDER
213	43T03385	BACK-BODY-ASSEMBLY

Location No.	Part No.	Description
214	43T39344	BEARING-BASE-ASSEMBLY
215	43T39343	MOTOR BAND (LEFT)
216	43T39329	MOTOR BAND (RIGHT)
217	43T09409	HORIZONTAL LOUVER
218	43T79313	CAP, DRAIN
219	43T44409	REFRIGERANT CYCLE ASSEMBLY
221	43T00598	PANEL-SERVICE-ASSEMBLY
222	43T80327	FILTER-AIR-R
223	43T80328	FILTER-AIR-L
224	43T09482	GRILLE OF AIR INLET
226	43T62344	TERMINAL COVER ASSEMBLY
227	43T66317	WIRELESS REMOTE CONTROLLER

12-2. Indoor Unit



Location No.	Part No.	Description
401	43T69319	TEMPERATURE SENSOR
402	43T50306	TEMPERATURE SENSOR
403	43T69320	TEMPERATURE SENSOR
404	43T62340	CORD-CLAMP

Location No.	Part No.	Description
405	43T6V316	PC BOARD ASSY;WRS-LED
406	43T6V335	PC BOARD
407	43T60378	TERMINAL
408	43T60417	TERMINAL

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